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of the New World

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PHILIP A. MUNZ
Professor of Botany, Pomona College

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THE ANTIRRHINOIDEÆ-ANTIRRHINEÆ
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In 1923, Miss Martha Hilend, a student at Pomona College, undertook a study of the southern California species of *Antirrhinum*. This work was carried on in the herbarium and in the field, but neither sufficient time nor material was available for any sort of conclusion regarding the status of the more confusing species. In 1924, therefore, during a stay of some months at the Gray Herbarium, I devoted considerable time to work on *Antirrhinum*. It soon became evident that an understanding of *Antirrhinum maurandioides* Gray and of *A. speciosum* (Nutt.) Gray involved the genera *Maurandya* and *Galvesia* respectively; and, finally, it was deemed best to study the other closely related genera for those species native to the New World. So far as possible, identification keys are presented also for species introduced from the Old World, but descriptions of such species are not included.

In addition to the Gray Herbarium (G), I visited and studied material in the following herbaria: New York Botanical Garden (NY), Philadelphia Academy of Natural Sciences (Ph), United States National Herbarium (US), Field Museum of Natural History (F), Missouri Botanical Garden

June 3, 1926

(M), University of California (C), California Academy of Sciences (Ca), Stanford University (S), and Pomona College (Po). The abbreviations indicated in parentheses above are those used in citing material in the various herbaria. To those in charge of the herbaria, to whose kindness I owe the privilege of examining and, in some cases, borrowing material, I hereby extend an expression of gratitude. To Miss Martha Hilend I express my thanks for color notes made in the field for several species.

KEY TO GENERA

- Leaves entire, ovate to lanceolate to linear, but not triangular-hastate, circular, reniform, cordate, nor lobed (except in 2 species of *Linaria* which have spurred corollas); corolla with definite palate more or less closing the throat, and saccate, gibbous or spurred at the base.
- Shrubs; leaves mostly opposite or in threes.....4. *Galvesia*
- Herbs; basal leaves often opposite, rarely in threes; cauline leaves mostly alternate.
- Fertile stamens 2, other 3 very rudimentary; seed with inrolled (cup-shaped) wing.....2. *Mohavea*
- Fertile stamens 4, the 5th rudimentary.
- Corolla with narrow spur at base of tube (spur very insignificant in *L. floridana* of the S. E. United States).....1. *Linaria*
- Corolla scarcely spurred, rather saccate or gibbous at base (with rather prominent but broad spur in *A. cornutum*)...3. *Antirrhinum*
- Leaves triangular-hastate, circular, reniform, or cordate, often crenate or lobed; corolla usually with internal plaits, but with true palate in one species only (*Maurandya antirrhiniflora*); corolla scarcely more than gibbous at base.
- Sepals decidedly thickened, indurated, gibbous at base, and with very evident midrib and reticulate veining; capsule thick walled, surmounted by beak-like, flattened, thickened base of style, dehiscing regularly by 2 clean, semicircular slits, one on each side of base of style; body of seed flat5. *Epixiphium*
- Sepals not much thickened, but membranaceous or foliaceous; capsule rather thin-walled, dehiscing with 2 irregular subterminal openings; style practically filiform; body of seed thick.

- Calyx herbaceous; floor of corolla throat either with plaits or two lines of hair; filaments with 2 rows of tack-shaped glands.....6. *Maurandya*
- Calyx membranous, purple; floor of corolla throat without ridges or lines of hair; filaments lacking glands.....7. *Rhodochiton*

I. LINARIA

The position of our native species in the genus *Linaria* has, I think, not been questioned. I have not gone into the generic position of some of the introduced ones, such as *L. elatine* (L.) Mill., *L. cymbalaria* (L.) Mill., and *L. minor* (L.) Desf., such a study scarcely being within the scope of this paper. Though I key these out in *Linaria*, such action should not be interpreted as an expression of opinion concerning the status of *Kicksia*, *Cymbalaria*, and *Chænorrhinum*.

KEY TO SPECIES

Throat of corolla completely closed by palate.

Flowers in terminal racemes and on erect or ascending stems.

Seeds subcylindric, longitudinally angled, truncate; native American species.....§ *Leptoplectron* Pennell

Spur slender, at least 5 mm. long; pedicels shorter than corollas, glabrate; racemes strict not branching; corolla generally 7-12 mm. long.

Seeds smooth, not covered with minute tubercles; corollas, exclusive of spur, usually not over 7-9 mm. long; eastern North America.....

.....1a. *L. canadensis* var. *typica*

Seeds covered with minute tubercles; corollas 9-12 mm. long; western North America to South America

.....1b. *L. canadensis* var. *texana*

Spur short, blunt, scarcely 1 mm. long; pedicels longer than corollas, glandular-puberulent; racemes commonly paniculately branched; corolla 5-7 mm. long; southeastern United States.....2. *L. floridana*

Seeds not subcylindric, truncate nor longitudinally angled, but triangularly angled or transversely corrugate; introduced species.

Spur short, blunt, scarcely $\frac{1}{3}$ the length of the corolla; flowers nearly white, striped with blue; perennial by horizontal rootstock3. *L. repens*

Spur longer, slender-pointed, over half the length of the corolla.

Seeds winged.

Flowers yellow or yellowish.

Perennial, 3-8 dm. high; pedicels equaling or exceeding calyx; calyx-segments ovate, glabrous, ca. half as long as mature capsule....5. *L. vulgaris*

Annual, 0.5-2.0 dm. high; pedicels often shorter than calyx; calyx-segments linear-oblong, glandular-pubescent, almost as long as mature capsule.....6. *L. supina*

Flowers pale lavender with yellowish palate; leaves lanceolate to lance-linear; plant annual or biennial. Known in America only from Newfoundland....4. *x L. sepium*

Seeds not winged.

Branches of 2 sorts (basal slender short ones 5-10 cm. long, with elliptic leaves ca. 3 mm. wide; and tall erect ones with filiform leaves ca. 1 mm. wide); corolla purple, throat yellow, reticulate with purple veins; plant annual or biennial; capsule indurated, surpassed by calyx7. *L. reticulata*

Branches not dimorphic as above, but all of one sort.

Flowers purple; plant erect, coarse, several dm. high; capsule indurate, scarcely equaling sepals8. *L. purpurea*

Flowers yellow.

Annual; very slender stemmed; pedicels filiform, longer than calyx; cauline leaves linear-filiform9. *L. spartea*

Perennial; fairly coarse.

Leaves ovate to lanceolate, half clasping; pedicels equal to or exceeding calyx10. *L. dalmatica*

Leaves lanceolate to linear, merely sessile; pedicels shorter than calyx11. *L. genistifolia*

Flowers solitary in the axils of prostrate stems.

Leaf-blades entire, pinnately veined, longer than petioles; stems with spreading pubescence.

Leaves broadly ovate, rounded or subcordate at base; corolla yellowish with purple upper lip.....12. *L. spuria*

Leaves hastate; corolla yellowish, purple beneath13. *L. elatine*

Leaf-blades palmately lobed, shorter than petioles; stems glabrous.....14. *L. cymbalaria*

Throat of corolla not completely closed by palate; glandular-pubescent annual with linear to linear-spatulate leaves; flowers shorter than pedicels, bluish.....15. *L. minor*

1. *LINARIA CANADENSIS* (L.) Dum.-Cours. Bot. Cult. 2:96, 1802.

Glabrous, dark green annual, or biennial; stems very slender and of two kinds, fertile ones erect or ascending, 1-5 (8) dm. high, simple or branched, leafy below and ending in slender pedunculate racemes, sterile stems largely basal, spreading or procumbent, filiform, 2-10 (15) cm. long, very leafy, sometimes elongating and becoming fertile; leaves of fertile stems entire, linear to linear-oblong, opposite or in 3's at the base, alternate above, acute to obtusish, sessile, blades 5-25 mm. long, 1-3 mm. wide, leaves of sterile stems crowded, entire, ovate to elliptic to linear, obtuse to acute, blades 3-20 mm. long, 1-3 mm. wide, sessile or on petioles 1-2 mm. long; inflorescence a glabrate, spicate slender raceme, flowers fairly crowded, but fruit scattered on nodes 5-25 mm. apart, peduncles 2-12 cm. long, racemes proper 5-30 cm. long, pedicels 2-10 mm. long, filiform, glabrate to finely

glandular-puberulent, ascending to appressed, each subtended by a minute subulate bract; calyx glabrate to glandular-puberulent, 5-parted into subequal herbaceous, lanceolate segments 2-3 mm. long with scarious margins and divergent tips; corolla pale blue to purplish blue, with reticulate veinings, strongly bilabiate, closed at throat, 7-12 mm. long exclusive of spur, glabrate without, tube whitish, slightly constricted above base, 2.5-4 mm. long, 1-2 mm. wide, glabrous within, with slender spur at base, upper lip reflexed, 4-5 mm. long, lobes oblong, 2-3 mm. long, lower lip spreading, deflexed, 5-10 mm. long, with the well formed palate convex, 2-ridged, pubescent, extending to base of lobes, lobes broad, suborbicular, 3-4 mm. long, middle one projecting beyond others; stamens glabrous, didynamous, 2-3 mm. long, included, filaments slightly dilated, scarcely geniculate, anther-sacs divergent, confluent, less than 0.5 mm. long, 5th stamen very rudimentary, represented by filament-base only; pistil glabrous, 2-3 mm. long, stigma entire, style equal to ovary; capsule 2.5-3.5 mm. long, cylindric-globose, equaling or slightly exceeding calyx, tipped by short stout persistent style, rather thin-walled and dehiscing irregularly by 2 large terminal pores; seeds subconic-cylindric, truncate, angled, not winged, less than 0.5 mm. long, smooth to tuberculate.

1a. *L. canadensis* var. *typica*, nom. nov.

Antirrhinum canadense L., Sp. Pl., 618. 1753. *Linaria canadensis* Dum.-Cours., Bot. Cult. 2:96. 1802. Chavannes, Monogr. Antirrh., 149. 1833. Pennell, Proc. Acad. Nat. Sci. Phila. 73: 501. 1922.

Corolla, exclusive of spur, from 7-9 mm. long; seeds smooth.

Type locality: Probably southern New Jersey (Pennell, Torrey 19:151. 1919). Herbarium material of this and of the next variety is so abundant that no attempt is here made to cite specimens, especially as the whole matter has been so adequately discussed by Pennell (Proc. Phila. Acad., 1. c.). I have seen sheets that I would refer to the var. *typica* from N. S., Me., N. H., Vt., Mass., R. I., Conn., N. Y., N. J., Md.,

Va., N. C., S. C., Ind., Ill., Ga., Ala., and Fla. From Venezuela I have seen two sheets that apparently belong here: Colonia Tovar, Aragua, *Pittier 9953* (G); and "prope coloniam Tovar," *Fendler 836* (Ph).

The intergradation between this and the next variety is quite complete and, as shown by Pennell, the roughness of the seeds is the best character.

1b. *LINARIA CANADENSIS* var. *TEXANA* (Scheele) Pennell, Proc. Acad. Nat. Sci. Phila. 73:502. 1922. Pennell in Millsp. & Nutt., Field Mus. Pub. Bot. 5:221. 1923.

L. texana Scheele, Linnæa 21:761. 1848. Rydb., Fl. Rocky Mts., 762. 1922. Small, Fl. S. E. U. S., 1056. 1903. Schulz, 500 Wildflowers of San Antonio, 190. 1922. *L. canadensis* of H. & A., Bot. Beechey, 153 and 375. 1833. Curtis Bot. Mag. 10: pl. 3473. 1836. Gray, Bot. Mex. Bound. Survey, 111. 1859. Bolander, Pls. San Fran., 21. 1870. Coulter, Rocky Mt. Bot., 273. 1885. Behr, Fl. Vic. San Fran., 153. 1888. Brandege, Proc. Cal. Acad. II, 1:215. 1888. Davidson, List Pls. L. A. Co., 13. 1892. Cat. Pls. L. A. Co., 22. 1896. McClatchie, Fl. Pasadena, 642. 1895. Anderson, Nat. Hist. Santa Cruz Co., 41. 1894. Howell, Fl. N. W. Amer. 1:504. 1901. Rydb. Fl. Colo., 305. 1905. Coulter & Nelson, Rocky Mt. Bot., 438. 1909. Frye & Rigg, N. W. Flora, 343. 1912. Wooton & Standley, Contr. U. S. Nat. Herb. 19:577. 1915. Abrams, Fl. L. A., 357. 1904 and 328. 1917., Jepson, Fl. W. Mid. Calif., 397. 1901 and 371. 1912. Davidson & Moxley, Fl. So. Calif., 324. 1923. Jepson, Man. Calif., 901. 1925.

Corolla, exclusive of spur commonly 9-12 mm. long; seeds covered with minute tubercles.

Type locality: "Zwischen Houston und Austin," Texas. Of wide distribution; I have seen material from S. Car., Ga., Ala., Miss., La., Texas, N. Mex., Ariz., Colo., Kansas, Okla., Mo., B. C., Wash., Ore., Calif., Mex., Colombia, Venezuela, Peru, Bolivia, Chile, Argentine, Uruguay, Santo Domingo.

Occasionally with much reduced flowers and becoming quite cleistogamous for example, Laguna Lakes, Orange Co., *Munz 6910* (Po) with corollas 4-5 mm. long and spur 3-4 mm.; and Potrero Grade, San Diego Co., Calif., *Munz 9464* (Po) with corollas ca. 2 mm. long and spur quite lacking.

2. *LINARIA FLORIDANA* Chapman, Fl. So. U. S., 290. 1860. Gray, Syn. Fl. N. Am. 2: 250. 1888. Small, Fl. S. E. U. S., 1056. 1903. Pennell, Proc. Acad. Nat. Sci. Phila. 71:258. 1920.

Glabrate or finely puberulent annual or biennial; stems very slender, much as in the preceding species but more glandular-puberulent; leaves of fertile stems linear, 5-25 mm. long, ca. 1 mm. wide, those of sterile stems as in preceding species; inflorescence finely puberulent, the racemes frequently paniculately branched, pedicels glandular-puberulent, 5-12 mm. long, exceeding the minute flowers; calyx glandular-puberulent, 2 mm. long, 5-parted into lanceolate greenish segments with hyaline margins; corolla like that of preceding species, but smaller, light blue, 5-7 mm. long, glabrous without, with spur scarcely 1 mm. long, corolla-tube ca. 2.5 mm. long, glabrous within, upper lip of corolla reflexed, ca. 2 mm. long, lobes oblong, ca. 1 mm. long, lower lip spreading, convex, 3 mm. long, with well formed pale palate with exceedingly minute pubescence, lobes ca. 1 mm. long, oblong, middle one projecting beyond others; fertile stamens didynamous 1.5 and 2.5 mm. long, filaments dilated, arcuate above, glabrous, not geniculate, anther-sacs divergent, confluent, ca. 0.5 mm. long; pistil scarcely 2 mm. long, glabrous, style 1 mm. long, stigma entire; capsule as in preceding species, but 2-3 mm. long; seeds ca. 3 mm. long, dark, somewhat subconic-cylindric, angled, relatively smooth.

Type locality: "Drifting sands near the coast, West Florida." Material studied: MISSISSIPPI: Horn Island, *Tracy & Earle in 1894* (F, US); Petit Bois Island, *Tracy 5106* (F, M, NY); Cat Island, *Lloyd & Tracy 89* (NY); Deer Island, *Earle 1417* (G). ALABAMA: Mobile, *Mohr in 1883* (G,

M), in 1878 (Ph, US). GEORGIA: Fifteen Mile Creek, Emanuel Co., *Harper* 976 (F, G, M, NY, US). FLORIDA: without locality, *Simpson* in 1889 (US), *Chapman* (G, M, NY, US); Pensacola, *Baker* in 1898 (NY, Po); Appalachicola, *Curtiss* 1846 (F, G, M, NY, Ph, US), *Chapman* (F, G, Ph, NY), *Chapman* 4106a (G, NY, US), *Chapman* in 1875 (G), *Saurman* in 1867 (F, Ph); Ft. Augustine, *Smith* in 1884 (F, G), St. Augustine, *Reynards* (NY); Indian River, *Palmer* 352 (G, M, NY, US); Eustis, *Hitchcock* in 1894 (M), *Nash* 192 (F, G, C, M, NY, Ph, US), *Hitchcock* 1421 (F); Leesburg, *Pennell* 9681 (G, NY, US); Hernando Co., *Hitchcock* 1420 (F), in 1898 (M); Polk Co., *Ohlinger* 459 (F, M); Apopka, *Pennell* 9679 (F, M, NY, Ph); and Jensen, *Curtiss* 5835 (G, C, M, NY, US).

3. LINARIA REPENS (L.) Mill., Gard. Dict., ed. 8, no. 6. 1768.

Antirrhinum repens L. Sp. Pl., 614. 1753. *Linaria striata* DC, Fl. France 3:586. 1805. Benth. in DC, Prodr. 10: 278. 1846. Introduced species, native to Europe; known in the New World from Newfoundland, New Brunswick, and New York.

4. x LINARIA SEPIUM J. G. Allm., Proc. Irish Acad. 2:404. 1844.

L. vulgari-repens Sowerby, Eng. Bot. 6:142. 1873.

Supposed to be a hybrid between *L. repens* and *L. vulgaris*. On this continent known only from Newfoundland.

5. LINARIA VULGARIS Hill, Brit. Herb. 108. 1756.

Antirrhinum linaria L. Sp. Pl., 616. 1753. *Linaria linaria* Karst, Deutsch. Fl. 947. 1880-83.

Native to Eurasia; widely introduced in North America. I have seen material from the southern provinces of Canada and most of the states of the Union.

6. *LINARIA SUPINA* (L.) Desf., Fl. Atlant. 2:44. 1800.

Antirrhinum supinum L., Sp. Pl., 615. 1753.

Native of the Mediterranean region. Known in America from Mass., N. Y., Penn., N. J., and Calif.

7. *Linaria pinifolia* (Poirot) n. comb.

Antirrhinum pinifolium Poirot, Voy. en Barb. 2: 193. 1789.

A. reticulatum Smith, Icon. Pict. Pl. Rar. 1: pl. 2. 1790.

Linaria reticulata Desf., Fl. Atlant. 2:48. 1800.

Native of the western Mediterranean region. It has been collected in Conn. and Calif. A specimen from near San Diego has been referred to *L. reticulata aureopurpurea*; I have been unable to check the status of this variety.

8. *LINARIA PURPUREA* (L.) Mill. Gard. Dict. Ed. 8, No. 5. 1768. *Antirrhinum purpureum* L. Sp. Pl., 613. 1753.

A native of southern Europe. It has been collected in New Jersey.

9. *LINARIA SPARTEA* Link & Hoff., Fl. Port. 1:233. 1809.

Native of southern Europe and northern Africa. Has been collected in Connecticut.

10. *LINARIA DALMATICA* (L.) Mill. Gard. Dict. Ed. 8, no. 13, 1768.

Antirrhinum dalmaticum L. Sp. Pl., 616. 1753.

Native of the eastern Mediterranean region and introduced into Pennsylvania and California.

11. *LINARIA GENISTIFOLIA* (L.) Mill. Gard. Dict. Ed. 8, n. 14. 1768.

Antirrhinum genistifolium L. Sp. Pl., 616. 1753.

Native of Austria, Hungary, etc. Introduced into Mass., New York, and Pennsylvania.

12. *LINARIA SPURIA* (L.) Mill. Gard. Dict. Ed. 8, no. 15. 1768.

Antirrhinum spurium L. Sp. Pl., 613. 1753. *Kicksia spuria* Dumont, Fl. Belg. 35, 1827. *Elatinoides spuria* Wettst. in Engl. & Prantl, Nat. Pfl. Fam. 4: Abt. 3b, 58, 1891.

Widespread in Europe and western Asia. In the New World it has been introduced into New York, New Jersey, Pennsylvania, Missouri, North Carolina, South Carolina, Alabama, Florida, California, and Chile.

13. *LINARIA ELATINE* (L.) Mill. Gard. Dict. Ed. 8, no. 16. 1768.

Antirrhinum elatine L., Sp. Pl., 612. 1753. *Kicksia elatine* Dumont, Fl. Belg. 35. 1827. *Elatinoides elatine* Wettst. in Engl. & Prantl, Nat. Pfl. Fam. 4: Abt. 3b, 58. 1891.

Widespread in Europe and about the Mediterranean. In the New World it has been collected in most eastern and southern states, in Oregon and California, in Bermuda, Cuba, and Haiti.

14. *LINARIA CYMBALARIA* (L.) Mill. Gard. Dict. Ed. 8, no. 12. 1768.

Antirrhinum cymbalaria L., Sp. Pl., 612. 1753. *Cymbalaria cymbalaria* Wettst. in Engl. & Prantl, Nat. Pfl. Fam. 4: Abt. 3b, 58. 1891.

Native to western Europe. Escaped in Ontario, many eastern states, Bermuda, Missouri, Oregon, and Puebla, Mexico.

15. *LINARIA MINOR* (L.) Desf., Fl. Atlant. 2:46. 1800.

Antirrhinum minus L., Sp. Pl., 617. 1753. *Chænorrhinum minus* Lange in Wilke & Lange, Prodr. Fl. Hisp. 2:579. 1870.

Widely distributed in Europe and northern Africa. Known in America from Quebec, New Brunswick, Nova Scotia, Ontario, Vermont, Connecticut, New York, Penn., N. J., Ala., Mich., Ind., Ill.

II. MOHAVEA

Flowers pale yellow, 2.5-3.5 cm. long; palate conspicuously purple dotted; tube and throat together ca. $\frac{1}{3}$ the length of the whole corolla; lower lip lobed to 6 or 8 mm. above the palate; stamens slightly pubescent; seeds less than 2 mm. long.....1. *M. confertiflora*

Flowers lemon yellow, 1.5-2.0 cm. long; palate not conspicuously dotted; tube and throat together ca. $\frac{1}{2}$ length of whole corolla; lower lip lobed to within 2 or 3 mm. of palate; stamens glabrous; seeds 2-2.5 mm. long2. *M. breviflora*

1. MOHAVEA CONFERTIFLORA (Benth.) Heller Muhlenbergia 8:48. 1912.

M. confertiflora in Johnston, Proc. Calif. Acad. IV, 12: 1164. 1924. Jepson, Man. Calif., 901. 1925.

Antirrhinum confertiflorum Benth. in D. C., Prodr. 10:592. 1846. Gray, Proc. Amer. Acad. 7:372. 1868. *Mohavea viscida* Gray, Pac. R. R. Rep. 4:122. 1857. Proc. Amer. Acad. 7:378. 1868. Bot. Ives Exped., 19. 1860. Bot. Calif., 1:552. 1876. Syn. Fl. N. Am. 2:254. 1888. Torrey, Pac. R. R. Rep. 5:363. 1857. Orcutt, Fl. So. & Lower Calif., 8. 1885. Curran, Proc. Calif. Acad. II, 1:234. 1888. Brandegee, Proc. Calif. Acad. II, 2:190. 1889. Davidson & Moxley, Fl. So. Calif., 326. 1923. Tidestrom, Contr. U. S. Nat. Herb. 25: 485. 1925.

Erect annual, simple or usually diffusely, corymbosely branched from below; stems viscid-villous to viscid-pubescent throughout, 8-45 cm. high; leaves ovate-lanceolate to lance-linear, entire, mostly heavily glandular-pubescent, blades 1-6 cm. long, gradually narrowing at base into short winged petiole 3-15 mm. long, acuminate above, lower leaves subopposite, upper ones alternate, narrowed, rather crowded; flowers borne singly in upper axils, somewhat clustered during anthesis; pedicels 5-10 mm. long in flower, elongating somewhat in fruit, heavily glandular-pubescent, ascending; calyx deeply 5-parted, herbaceous, viscid-villous, campanulate, somewhat oblique, calyx-lobes lanceolate to lance-linear, subequal,

9-13 mm. long, 1.5-2.5 mm. wide, in fruit suberect and 12-20 mm. long and up to 5 mm. wide; corolla strongly bilabiate, slightly pubescent without, 2.5-3.5 cm. long, silky, pale yellow, closed at throat, corolla-tube saccate anteriorly, very short, passing insensibly into the short narrow throat, the two together ca. $\frac{1}{3}$ the length of the whole corolla, pubescent within above the very base, flattened, corolla-limb large, expanded, dorsally compressed, not reflexed, upper lip dotted with purple, 1.5-2 cm. long, almost as wide, obscurely lobed, the 2 lobes broad, obtuse, lower lip also dotted, especially on the prominent deep-yellow, hairy palate, of about equal length to upper, with 3 lobes subapiculate, and about one-fourth as long as whole lip, middle lobe narrowest, palate coming out almost $\frac{1}{2}$ way onto lower lip; 2 lower stamens fertile, dilated, curved toward tip, slightly glandular above, somewhat pubescent at base, 9-10 mm. long, not geniculate, anther-sacs confluent, short, each ca. 0.5 mm. long; other 3 stamens aborted, ca. 1 mm. long, middle one without vestige of anther, others with it; stigma subglobular, entire, style ca. equal to the fertile stamens, filiform, persistent, slightly flattened, glandular-puberulent, ovary glandular-puberulent, 2-celled; capsule globular to slightly elongate, 10-12 mm. long, thin-walled, dehiscing by 2 subterminal, irregularly lacerate openings; seeds barely 2 mm. long, dark, rather flat, the ventral face with an emarginate, inrolled (cup-shaped) striate wing.

Type locality: Colorado Desert of California. Material studied: NEVADA: Eldorado Cañon, Lincoln Co., *Davis 61* (M); Eldorado Cañon near Colo. River, *Tidestrom 8787* (Ph). ARIZONA: Ft. Mohave, *J. G. Lemmon & wife in 1884* (US), *Cooper in 1861* (G, US); Riverside Mt., near Colorado River, *Newberry* (G, NY), *Grinnell in 1910* (C); Ehrenberg (without definite label on some sheets), *Palmer 336, in 1876* (C, F, M, NY, Ph, US); Bill Williams Creek, *MacDougal 28* (NY); Ft. Yuma, *Major Thomas* (G, NY). CALIFORNIA: So. California, *Parry & Lemmon 292* (F, M, NY, Ph); Mohave Desert, *Mrs. Curran in 1884* (G), *Mr. & Mrs. Lemmon in 1884* (C); Mohave Creek, *Bigelow on*

Whipple Exp. (G, NY); Daggett, *K. Brandegee in 1914* (C), *Munz & Keck 7848* (Po); Kane Spring, Ord Mts., *Hall & Chandler 6818* (C, M, Po); Cushenberry Cañon, *Parish 4952* (S); Calico, *Parish 9814* (S); Warm Springs, Mohave Desert, *S. B. & W. F. Parish 209* (F, M, NY, Ph, S, US); Needles, *Munz & Harwood 3638* (Po, S), *3605* (Po), *Jones 3829* (F, NY, Po, US); Eagle Mts., Colorado Desert, *Munz & Keck 4825* (Po); Mecca, *Mrs. Clemens in 1922* (Ca); Painted Cañon, *Jaeger 1025* (Po), *Spencer 591, in 1920* (Po); Indio Mt., *Hall 5778* (C, F, G, M, NY, Ph, Po, S, US); Palm Springs, *Parish in 1896* (NY), *Eastwood in 1913* (Ca), *Saunders in 1903* (Ph); Palm Creek, *Mrs. Thurber in 1895* (C); Coachella, *Greata 410* (S); Ironwood Well, *T. S. Brandegee in 1905* (C); Cathedral Cañon, *Hall 5767* (C); Santa Maria Mts., *Schellenger in 1905* (C); Near Blythe, *Jones in 1924* (Po); 40 miles north of Yuma, *MacDougal 67* (NY); Yaqui Wells, *Eastwood 2638* (Ca, G, NY, US); Rocky Cañon, Mt. Springs, *Orcutt 1515* (M, US); Cariza Creek, *Schott* (F); near Borego Spring, *Jones in 1906* (Po); San Felipe, *T. S. Brandegee in 1898* (NY), *Purpus in 1898* (Po); Signal Mt., *Abrams 3173* (G, M, NY, S), *Brandegee in 1901* (C); between Santa Ysabel and Ft. Yuma, *Schott* (F); San Diego Co., Colo. Desert, *Spencer 591, in 1917* (G, Po); Colorado Desert, *Brandegee in 1901* (US); without locality, but from Colo. Desert, *Coulter 616* (G, part of type collection); Santa Catalina Mission, San Diego Co.?, *Orcutt in 1889* (US). LOWER CALIFORNIA: without locality, *Streets* (G); Angel Island, *Streets in 1875* (US); Angel de la Guardia Island, *Johnston 4228* (Ca, G); Los Angeles Bay, *Palmer 597* (G, US); Cucupa Mts., *MacDougal in 1905* (NY); Cajon de Santa Maria, *Brandegee in 1889* (C, S).

2. *MOHAVEA BREVIFLORA* Coville, Contr. U. S. Nat. Herb. 4:168, pl. 17. 1893.

M. breviflora of Tidestrom, Contr. U. S. Nat. Herb. 25: 485. 1925. Jepson, Man. Calif., 901. 1925.

Erect, usually widely branching annual, viscid glandular-villous practically throughout (upper surfaces of leaves sometimes glabrate), 5-15 cm. high; leaf-blades 1-4 cm. long, ovate-lanceolate, entire, acuminate, tapering at base into winged petioles 5-10 mm. long, upper leaves somewhat reduced, crowded, each with single axillary flower; pedicels slender, ascending, 3-8 mm. long; calyx 5-parted almost to base, calyx-lobes in flower oblong-linear, obtuse or bluntly acute, subequal, ca. 10 mm. long, 2-3 mm. wide, in fruit ca. 12 mm. long; corolla 17-20 mm. long, lemon-yellow, strongly bilabiate, pubescent without, corolla-tube saccate anteriorly, 2-3 mm. long, corollathroat 5-6 mm. long, ca. 5 mm. wide, strongly flattened, pubescent within on lower side, corolla-limb scarcely reflexed, flattened, the upper lip 7-8 mm. long, ca. 6 mm. wide, with 2 rounded lobes divided ca. one-third the way down, lower lip ca. same length, with prominent pubescent yellow palate for half its length, its 3 lobes divided for ca. 3 mm., middle one slightly narrower; fertile stamens 2, scarcely dilated, practically glabrous, anther-sacs confluent, the 2 together scarcely 1 mm. across; sterile filaments as in the preceding species; pistil ca. 9 mm. long, glandular-puberulent; stigma globose, style persistent, ovary glandular-puberulent; capsule 2-celled, globular, rather thin-walled, included in calyx, dehiscing as in *M. confertiflora*; seeds dark 2-2.5 mm. long, body flattened with emarginate inrolled, cupulate, striate, subentire wing.

Type locality: Johnson Cañon in Panamint Mts., Inyo Co., California. Material seen, from CALIFORNIA: Panamint Mts., *Coville & Funston* 547, type collection (G, M, NY, Ph, US); Wild Rose Cañon, Panamint Mts., *Ferris, Scott, & Bacigalupi* 3944 (S), *Parish* 10085 (S); Pleasant Cañon, Panamints, *Hall & Chandler* 6937; Emigrant Cañon, Panamints, *Ferris, Scott & Bacigalupi* 4016 (S); Funeral Mts., *Jones in* 1907 (Po); Furnace Creek, *Parish* 9865 (C, S); Greenwater Flats, *Parish* 10051 (C, S); Shepherd Cañon, *Hall & Chandler* 7063 (C); *Darwin, Jones in* 1897 (M, Po, US); *Keeler, Brandegee in* 1891 (C); Lone Willow Spring, *Parish* 10178 (C, S); Salt Wells Cañon, on Trona Road,

Ferris, Scott & Bacigalupi 3919 (S); Amargosa Desert, *Jones in 1907* (Po); Kelso, *Jones in 1906* (Po); Saratoga Spring, *Jones in 1924* (Po); Mohave Desert, without locality, *Mrs. Curran in 1884* (G). NEVADA: Moapa, *Tidestrom 8684* (Ph); Mica Spring, *Jones 5045ag* (US).

This species, which has received very little attention, is not only a very distinct one in characters, but also in distribution, being found for the most part north of the middle portion of San Bernardino Co., Calif., while *M. confertiflora* extends largely from its southern limit south into Lower California.

III. ANTIRRHINUM

Capsule more or less oblique, dehiscing by fairly definite terminal or subterminal pores.

Seeds not cup-shaped.

Throat of corolla quite closed by palate.....

.....§ *Antirrhinastrum*. Chavannes.

Corolla 3-5 cm. long; perennial, with purple, red, white or yellow flowers in dense terminal glandular-pubescent racemes; naturalized from Europe.....3. *A. majus*

Corolla not over 2 cm. long; usually annuals; native to western North America.

Stems self-supporting, lacking filiform tortile branchlets.

Plants stout; flowers reddish, 16-19 mm. long; corolla-tube merely saccate at base; hair on calyx, if present, merely glandular and short, not villous and long.

Glabrous throughout (except in the flower), perennial; leaves linear4. *A. virga*

Glandular - pubescent throughout; annual or biennial; leaves lanceolate5. *A. glandulosum*

Plants slender; flowers 10-12 mm. long, bluish with yellow palate; corolla-tube with large spur at base almost half the length of the tube itself; calyx glandular-villous, the

longer hairs $\frac{2}{3}$ the length of the calyx-segments.

Filaments all strongly oblique-dilated and pubescent toward tips; style in fruit about 5 mm. long and at least as long as capsule6a. *A. cornutum* var. *typicum*

Filaments glabrous toward tips, only longer pair strongly oblique-dilated; style in fruit ca. 4 mm. long and scarcely equaling the capsule6b. *A. cornutum* var. *leptaleum*

Stems in mature plants largely supporting themselves on surrounding vegetation by tortile branchlets, or at least possessing such.

Plant simple below, erect, glabrous except for the glandular-vilous, dense, spicate raceme; leaves of inflorescence reduced to minute bracts; flowers whitish with the lower lip forming a large part of the whole7. *A. coulterianum*

Plant usually branching below and pilose or glandular-pubescent along base of stem (if this is glabrate, then dorsal sepal is conspicuously enlarged); inflorescence lax or fairly dense but not set off sharply by its pubescence and leaflessness from the upper part of the stem.

Palate and corolla-tube with 2 bands of hairs, the tips of which are conspicuously enlarged and tack-shaped; pedicels 5-20 mm. long, exceeding calyx; corolla-tube merely gibbous at base, about as long as lower lip.....8. *A. nuttallianum*

Palate and corolla-tube only minutely and rather uniformly glandular - puberu-

lent or puberulent; pedicels mostly shorter than calyx (except in *kingii*).

Corollas 16-18 mm. long; dorsal segment of calyx 10-20 mm. long, several ribbed; coarse herb, frequently 7-8 dm. high and densely leafy9. *A. subcordatum*

Corollas 8-16 mm. long; dorsal segment of calyx not exceeding 10 mm. in length, nor with more than 3 ribs; rather slender herbs not densely leafy, usually less than 5 dm. high.

Flowers light purple, 10-15 mm. long, on pedicels 2-5 mm. long; stems glandular - pilose to glandular - pubescent at least above.

Stems scatteringly pilose below, glandular - pilose in inflorescence; corolla 13-15 mm. long; calyx ~ segments strongly differentiated, the enlarged upper one at least two-thirds as long as corolla tube and throat, and 8-10 mm. in length

....10a *A. vexillo-calyculatum*
var. *typicum*

Stems quite glandular - pubescent throughout; corolla 10-12 mm. long; calyx - segments not strongly differentiated, the longest one-half as long as corolla-tube and throat, or 4-6 mm.

...10b. *A. vexillo-calyculatum*
var. *breweri*

Flowers largely whitish, 7-8 mm. long, on pedicels 5-20 mm. long; stems glabrate except for white-woolly base and fine glandular-pubescent among flowers.

Pedicels 4-6 mm. long in fruit; upper calyx-segment 5-7 mm. long, lateral ones 3-4 mm. Ore. to Ariz. and Calif.

...11a. *A. kingii* var. *typicum*

Pedicels 9-20 mm. long in fruit; calyx-segments subequal, 3-4 mm. long. Mexico.

...11b. *A. kingii* var. *watsoni*

Throat of corolla widely open; corolla ca. 20 mm. long; upper lip pink, lower white; corolla-tube subarcuate; longer filaments well dilated and glandular-puberulent toward tip.

Eastwoodiella sect. nov. One species.....12. *A. ovatum*

Seeds appearing cup-shaped because of broad incurved wing; slender erect annual with narrow leaves; flowers purple or white, ca. 12 mm. long; calyx-segments linear.....§ *Orontium*. 1. *A. orontium*

Capsule not oblique; dehiscence by irregular bursting.

Seeds strongly cup-shaped; erect, viscid-pubescent annual with bluish flowers 11-13 mm. long; stamens not dilated toward tips.....§ *Pseudorontium*. 2. *A. cyathiferum*

Seeds not at all cup-shaped; glabrate annuals at first erect and becoming climbers by the very long capillary pedicels.....§ *Maurendella* Gray, in part

Flowers yellow, 11-13 mm. long; stems very slender; corolla-tube saccate at base; desert plants13. *A. filipes*

Flowers blue, 13-15 mm. long; lower part of stem fairly stout; corolla-tube gibbous at base; coastal plants.....14. *A. strictum*

1. ANTIRRHINUM ORONTIUM L., Sp. Pl., 617. 1753.

Native of the Old World, where widely distributed. Occasionally naturalized in America: Prince Edward Island, *Fernald & St. John 11176* (G); Buffalo, N. Y., *Clinton* (Ph); Hayfield, Ky.?, *Short in 1855* (Ph); Mobile, Ala., *Mohr in 1888* (US); Brownsville, Ore., *Hasken 9* (S); Havana, Cuba, *Curtiss 681* (NY); St. Helens Gap, Jamaica, *Britton 75* (NY); *Maxon & Killip 592* (US); Furcy, Haiti, *Leonard 4293* (NY, US).

2. ANTIRRHINUM CYATHIFERUM Benth., Bot. Sulph., 40. pl. 19. 1844.

A. cyathiferum Benth. in D. C., Prodr. 10:290. 1846. Gray, Proc. Am. Acad. 7:372. 1868. Bot. Calif. 1:548. 1876. Proc. Am. Acad. 12:81. 1876. Syn. Fl. N. A. 2:251. 1888. Curran, Proc. Calif. Acad. II, 1:234. 1888. Brandegee, Proc. Calif.

Acad. II, 2:190. 1889. Vasey & Rose, Contr. U. S. Nat. Herb. 1:74. 1890. Johnston, Proc. Calif. Acad. IV, 12:1159. 1924. *A. chytrospermum* Gray, Proc. Am. Acad. 12:81. 1876. Syn. Fl. N. A. 2:251. 1888.

Erect, rather coarse annual, 5-45 cm. high, commonly branching from base, viscid glandular-pubescent throughout; branches ascending and very leafy; leaves alternate, or lower opposite, rather thick, ovate, entire obtuse to acute, leaf-blades 5-25 mm. long, 3-14 mm. wide, narrowed at base into winged petioles, these 5-13 mm. long, leaves gradually reduced up the stem; flowers axillary, solitary, occurring from near base of plant, pedicels filiform, strongly recurved after anthesis, 3-5 mm. long; calyx herbaceous, campanulate, somewhat oblique, glandular-pubescent without and within, 5-parted into lanceolate, subequal segments 4-5 mm. long, bulging in fruit and 6-7 mm. long; corolla bluish, bilabiate, glandular-puberulent without, apparently closed at throat, 11-13 mm. long, tube and throat not distinguishable, scarcely saccate at base, not strongly inflated upward, 5-6 mm. long, 2.5 mm. wide, pubescent within on floor except at very base, upper lip ca. 4 mm. long, suberect, arched, glabrous within, the 2 lobes oblong-ovate, ca. 1.5 mm. long, lower lip ca. 5 mm. long, spreading, with large yellowish, glandular-villous palate extending to base of the oblong-ovate lobes, these ca. 2 mm. long, the middle one narrowest; fertile stamens slightly didynamous, 7 and 8 mm. long, filaments not dilated, quite geniculate, weakly pubescent at genicula; anther-sacs ca. 2 mm. long, divergent, confluent, deltoid-oblong, fifth stamen very rudimentary; pistil about as long as stamens, stigma entire, slightly enlarged, style 4.5-5 mm. long, persistent, glandular-puberulent in lower half, ovary globose, glandular-puberulent; capsule globose, not oblique, thin-walled, 7-8 mm. long, somewhat puberulent, the 2 valves projecting slightly beyond base of style, each dehiscing irregularly at apex; seeds straw-colored, body barely 1 mm. long, plano-convex in cross-section, with several irregular ridges on convex side and a broad incurved cupulate wing around margin of plane side, giving whole seed a cupulate appearance.

Type locality: Magdalena Bay, Lower California. Material studied: ARIZONA: Ehrenberg, *Palmer in 1876* (G, US, type collection of *chytrospermum*); Maricopa, *Parry in 1881* (F, G, M), *Parish in 1881* (S). SONORA: N. W. Sonora, *Pringle in 1884* (F, G, M, NY, US); Papago Tanks, Pinacate Mts., *MacDougal 44* (US); Tiburon Island, *Johnston 4414* (Ca); Guaymas, *Palmer 1211* (US), *Brandegee in 1893* (Po, US), *Palmer 152* (G, NY, US). LOWER CALIFORNIA: Cucupa Mts., *MacDougal 132* (NY); Santa Gertrudis, *Orcutt* (C); Calamahue, *Nelson & Goldman 7138*; Calmalli, *Purpus in 1898* (C, NY); Santa Maria Bay, *Rose 16281* (NY, US); Angel de la Guardia Island, *Johnston 3386* (Ca, G), *4202* (Ca, G); San Francisquito Bay, *Johnston 3575* (Ca); San Nicolas Bay, *Johnston 3730* (Ca); Arroyos San Pablo, *Purpus in 1898* (F, S), *208* (US); La Paz, *Palmer 91* (F, G, NY, US), *Brandegee 427* (NY); Magdalena Island, *Brandegee in 1888* (C), *in 1889* (G, Ph, US); Margarita Island, *Nelson & Goldman 7302* (US); San Jose del Cabo, *Purpus 453* (M, US), *Brandegee 427* (C).

Some plants have calyx-segments slightly wider than do others, but the differences given by Gray (Syn. Fl., 2:251. 1888) as distinguishing *cyathiferum* of Mex. from *chytrospermum* of Ariz. are not tenable (Vasey & Rose, l. c.). I am unable to find characters that will maintain even varietal distinction.

3. ANTIRRHINUM MAJUS L., Sp. Pl., 617. 1753.

Native of Mediterranean region. Occasionally becoming naturalized in America: Bridgeport, Conn. *Eames 8827* (G); Philadelphia, *Parker in 1877* (G); Evanston, Ill., *Shipman in 1874* (Ph); Salem, Ore., *Nelson 3202* (Ph); Santiago de las Vegas, Cuba, *Van Hermann 846* (F, NY), *5154* (NY, Po); Oaxaca, Mex., *Conzatti & Gonzalez 1267* (G); Puebla, *Arsène 1973* (US); Querétaro, *Arsène 10520* (NY, US), *10479* (US); Volcan de San Salvador, *Calderon 541* (US), *Standley 22853* (US).

4. *ANTIRRHINUM VIRGA* Gray, Proc. Am. Acad. 7:373. 1868.

Bot. Calif. 1:549. 1876. Syn. Fl. N. Am. 2:252. 1888. Greene, Man. Bot. San Fran. Bay, 270. 1894. Jepson, Fl. West. Mid. Calif., 370. 1911 and 396. 1901. Armstrong, West. Wildflowers, 468. 1915. Jepson, Man. Calif., 898. 1925.

Erect perennial, glabrous throughout and with many coarse virgate stems from a single base, 6-15 dm. high, occasionally branching above; leaves thickish, alternate, rather crowded, linear, sessile, acute, 2-9 cm. long, 3-7 mm. wide, gradually reduced up the stem, becoming linear-subulate bracts less than 1 cm. long in the inflorescence, midrib of leaf ending in rather obscure gland-tip; inflorescence a secund, spicate rather crowded raceme 1-7 dm. long, pedicels ascending, 3-7 mm. long, slender; calyx herbaceous, oblique-campanulate, 5-parted into subequal, ovate-lanceolate, acuminate segments (the 2 lower slightly wider and shorter than the others), 6-7 mm. long, not much enlarged in fruit, though somewhat distended by the capsule, but still with connivent tips; corolla "red-purple," 16-18 mm. long, closed at throat, corolla-tube and throat scarcely distinguishable, tubular with broad saccate spur which is 1.5-2 mm. long, tube slightly constricted above ovary, 10-12 mm. long, 3-3.5 mm. wide, slightly ampliate at throat, pubescent within from base of palate downward, upper lip reflexed, 5-6 mm. long, pubescent, lobes ovate to suborbicular, 2 mm. long, lower lip spreading, 6-7 mm. long, with prominent villous palate, the 3 lobes deflexed, suborbicular, ca. 2.5 mm. long; fertile stamens didynamous, 12 and 13 mm. long, filaments glandular-villous throughout, very dilated toward the tips, geniculate and especially hairy above the base, anther-sacs divergent, confluent, each ca. 0.5 mm. long; pistil equaling stamens, glabrous, curved, slightly bifid at apex; capsule rather thin-walled, strongly oblique, 7-8 mm. long, 4-5 wide, sub-ovoid, somewhat truncate above, with 4 tuberculate umbos about base of persistent, often deflexed or geniculate style, dehiscing apparently by a slit on edge of each umbo; seeds

dark, ovoid, ca. 1.5 mm. long, with several fimbriate, wing-like longitudinal ridges.

Type locality: "California." *Material studied*: CALIFORNIA: without locality, *Bridges 191*, type collection (G, NY, US); Mendocino Co., *Vasey in 1875* (US), *in 1876* (G); Calpella, *Blankenship in 1893* (M); Ukiah, *Purdy* (C), *Chestnut 376* (US), *Eastwood in 1894* (G), *11364* (Ca); Allen Springs, *Cleveland in 1882* (G, S); Witters Springs, *Rattan in 1885* (G); Houghs Springs, *Heller 12376* (Ca, F, G, M, NY, Ph, Po, S, US); Adams Springs, *Tracy 2251* (C); Sonoma Creek, *Heller 5775* (F, G, M, NY, Ph, Po, S, US); Hoods Peak, *Michener & Bioletti 6194* (NY), *in 1893* (F, C, M, Ph, Po, US); Mt. St. Helena, *Greene in 1894* (C), *Jepson in 1893* (C); Cazadero, *Carruth in 1901* (Ca); Howell Mt., *Tracy 368* (C); Atlas, *Mrs. Wilson in 1920* (Ca).

5. ANTIRRHINUM GLANDULOSUM Lindl., Bot. Reg. 22: pl. 1893. 1836.

Benth. in D. C., Prodr. 10:291. 1846. Torrey, Pac. R. R. Rep. 7, pt. III, p. 15. 1856. Hooker & Arnott, Bot. Beechey, 375. 1840. Gray, Proc. Am. Acad. 7:373. 1868. Syn. Fl. N. Am. 2:252. 1886. Bot. Calif. 1:549. 1876. Rattan, Pop. Calif. Fl., 90. 1880. Greene, Man. Bot. San Fran. Bay, 270. 1894. Anderson, Nat. Hist. of Santa Cruz Co., 41. 1894. McClatchie, Fl. Pasadena, 642. 1895. Davidson, List Pls. L. A. Co., 13, 1892. Cat. Pls. L. A. Co., 22. 1896. Jepson, Fl. West. Mid. Calif., 396. 1901. 370. 1912. Abrams, Fl. L. A., 358. 1904. 329. 1917. Armstrong, Western Wildflowers, 468. 1915. Davidson & Moxley, Fl. So. Calif., 325. 1923. Jepson, Man. Calif., 898. 1925.

Stout widely branched annual or short-lived perennial, viscid glandular-pilose throughout. 6-15 dm. high; branchlets spreading, non-tortile; leaves numerous, thickish, entire, acute, lanceolate, sessile, 1-6 cm. long, 3-15 mm. wide, gradually reduced up the stem to leafy bracts, the mid-rib ending in more or less evident gland-tip; inflorescence a terminal subsecund.

dense spicate raceme, 0.5-5 dm. long, pedicels fairly stout, appressed, 5-7 mm. long; calyx oblique, herbaceous, 5-parted, segments unequal, lanceolate to ovate-lanceolate, upper one 10-13 mm. long, others 7-9 mm., acute to acuminate, not much enlarged in fruit; corolla rose-red except for the cream-colored to yellowish palate, 17-19 mm. long, glandular-pubescent without, corolla-tube and throat scarcely distinguishable, saccate at base, cylindrical, 10-11 mm. long, 4-5 mm. wide, glabrate within, whitish with rose-colored lines, upper lip reflexed, 6-7 mm. long, the 2 broadly-oblong lobes scarcely 2 mm. long, and folded back against each other, lower lip erect, 7-8 mm. long, with prominent hairy palate, lobes deflexed, rounded, 2-3 mm. long, middle one largest; fertile stamens didynamous, dilated, ciliate-pubescent, geniculate, heavily bearded at genicula, longer ones ca. 12 mm. long, widely dilated at base, shorter ones ca. 11 mm. long, genicula rather high, glabrous below, anther-sacs divergent, confluent, ca. 5 mm. long, 5th stamen very reduced; pistil almost as long as stamens, glandular-pubescent except at deflected, slightly 2-lobed tip; capsule glandular-pubescent, erect, oblique, ovoid, 8-9 mm. long, 5-7 mm. wide, with persistent style bent forward, about base of which are 4 lobes, the 2 posterior ones close together and tending to dehisce by one pore, the 2 anterior ones farther apart and each dehiscing by its own pore; seeds brown, ovoid, ca. 1 mm. long, with numerous broken fimbriate, wing-like ridges.

Type locality: "California." Material studied: CALIFORNIA: without locality, *Douglas*, presumably type material (G), *Hartweg* (G), *Palmer in 1876* (G, M), *Anderson 296* (M), *Lemmon 33* (M); *Murphys*, Calaveras Co., *Davy 1607* (C); Calaveras Valley *K. Brandegee* (C); Santa Clara, *Bolander* (F, G, M); Loma Prieta Peak, *Elmer 4384* (Ca, M, NY, Po, S, US); Mt. Hamilton Range, *Abrams 6639* (NY, Ph, S), *Greene in 1891* (NY), *Williamson in 1906* (Ph), *Smith in 1906* (S); Madrone Springs, *Dudley in 1895* (Ph, S, US); Santa Cruz, *Hartweg 1887* (NY); Santa Cruz Mts., *Kellogg & Harford 659* (M, NY, US), *Pendleton 401* (C), *Davis 105* (C); Los Gatos, *Cannon in 1894* (Ca); Santa

Cruz, *Pringle* in 1882 (F, M, Ph, US); Big Basin, *Pendleton* in 1908 (C); the Pinnacles, *Mrs. Sutcliffe* in 1920 (Ca, Ph), *Eastwood* 6747 (Ca), *Bacigalupi* in 1922 (S); Carmel River, *Clemens* in 1910 (Po), *McGregor* 62 (S), *McMurphy* in 1906 (S); Paraiso Springs, *Congdon* in 1881 (S); Tassajara Hot Springs, *Elmer* 3361 (M, S, US); Gavilan Range, *Brewer* 745 (C, M, US); Santa Lucia Mts., *Plaskett* 146 (G, NY, US), *K. Brandegee* in 1909 (C), *Vasey* 447 (Ph, US), *Jepson* 1689 (M); Blochman Ranch, Santa Maria, *Eastwood* 475 (Ca, US); San Luis Obispo Co., *Summers* (C); Santa Barbara Co., *Baker* in 1895 (NY); Santa Barbara, *Nuttall* (G), *Brewer* 745 (G), *Lemmon* (F), *Franceschi* in 1894 (C); Zaca Lake, *Eastwood* 576 (Ca, US); Montecito, *Bingham* (NY); Santa Inez Mts., *T. S. Brandegee* in 1888 (C); Painted Cave Ranch, near Santa Barbara, *Eastwood* 112 (US); Mt. Piños, *Dudley & Lamb* 4803 (S), 4763 (S); Ojai, *Peckham* in 1866 (G, US), *Bidwell* in 1889 (M); Matilija, *Kendall* in 1922 (Po); Fillmore, *Hall* 3125 (C); Nordhoff, *S. Fauntleroy* in 1919 (Ca); Oakgrove Cañon, *Abrams & McGregor* 383 (C, NY, S, US); Newhall Mts., *Nezvin* 16 (G); Topatopa Mts., *Abrams & McGregor* 153 (NY, S, US); Newhall, *Parish* 1938 (F); Sespe Creek, *Munz* 9403 (Po); Verdugo Cañon, *Macbride & Payson* 751 (G); Mt. Lowe, *Williamson* in 1901 (Ph), *Drushel* in 1915 (M), *Dudley* in 1900 (S); Pasadena, *Jones* in 1902 (Po), *McClatchie* in 1893 (NY); San Gabriel Mts., near Pasadena, *Grinnell* in 1916 (Ca); Soma Cañon, L. A. Co., *Barber* in 1898 (C, M, Po); Covina, *Grant* in 1904 (C, F, M, Ph, S); Little Santa Anita Cañon, *Abrams* 2630 (G, M, Ph, Po, NY, S, US); San Antonio Cañon, *Johnston* in 1917 (C, S); Cajon Pass, *Parish* 436 (C, M, US); Arrowhead Springs, *Feudge* 89 (Po); San Bernardino, *Parish* in 1880 (M); Cucamonga Mt., *S. B. & W. F. Parish* 436 (F, M, Ph); Keller Creek, San Bernardino Mts., *Smith* 2 (C).

6. ANTIRRHINUM CORNUTUM Benth., Pl. Hartw., 328. 1848.

Erect, rather slender annual, viscid-villous throughout, simple or with few ascending branches, 1-5 dm. high; leaves

alternate, linear-oblong to linear-lanceolate to oblong-ovate, obtuse to emarginate at apex, the midrib ending in rather evident gland, leaf-blades 1-2.5 (5) cm. long, 3-10 (20) mm. wide, narrowed at base into slightly winged petioles 4-8 (12) mm. long, leaves not conspicuously reduced up the stem; flowers borne singly in axils of all but lowest leaves, subsessile; calyx herbaceous, glandular-villous with some hairs at least half as long as calyx-segments, which are 5, separate almost to base, linear-oblong to oblong-lanceolate, acute to obtuse or rarely emarginate; corolla bluish, with yellow palate, villous without, corolla-tube and throat scarcely distinguishable, cylindrical, 6-7 mm. long, 2-3 wide, glabrous within, except just below palate, with spur prominent, rounded, 2.5 mm. long, upper lip reflexed, 4-5 mm. long, lobes blunt, ca. 2.5 mm. long, bent back almost against each other, lower lip ca. 6 mm. long, erect, with large villous palate, lobes deflexed, rounded, ca. 3 mm. long; fertile stamens didynamous, ca. 5 and 6 mm. long, somewhat oblique-inflated toward the tips, geniculate and with heavy pubescence at genicula, anther-sacs confluent, divergent, 5th stamen very reduced; pistil about length of stamens, glandular-pubescent except at subentire, bent tip; capsule somewhat oblique, ovoid, 6-7 mm. long, glandular-pubescent, tipped with stout persistent, somewhat deflexed style, ca. 5 mm. long, dehiscing by 2-4 small openings; seeds ovoid, ca. 0.6 mm. long, echinate-favose.

6a. ***Antirrhinum cornutum* var. *typicum***, nom. nov.

A. cornutum Gray, Proc. Am. Acad. 7:373. 1868. Bot. Calif., 1:549. 1876. Jepson, Man. Calif., 898. 1925, in part. *A. leptaleum* of Howell, Fl. N. W. Am. 1:504. 1901. *A. leptopetalum* of Frye & Rigg, N. W. Flora, 343. 1912. *A. cornutum* var. *venosum* Jepson, Man. Calif., 898. 1925.

Fertile filaments all strongly oblique-dilated and ciliate-pubescent toward tip; style ca. 5 mm. long, equal to or slightly exceeding in length the capsule.

Type locality: Probably Sacramento Valley. Specimens seen; CALIFORNIA: without locality, but without doubt

from Sacramento Valley, *Hartweg* 1888, type collection (G, NY); California, *Bridges* 192a (NY, US); Mt. Shasta, *Grant* 5271 (C, S); Pitt to Baird, *Eastwood* 1406 (Ca, G, NY, US); Kennet, *Eastwood* 727 (Ca, US); Redding, *Jones & Alexander* in 1902 (C); Red Bluff, *Nickes* in 1917 (Ca); Chico, *Bidwell* in 1878 (G), *Eastwood* in 1913 (Ca, US), *Heller* 11562 (C, Ca, F, G, Mo, NY, Ph), *Green* in 1890 (NY, US), *Austin* 1833 (Po, US); South Fork, *K. Brandegee* (C); Stony Creek, Colusa Co., *Rattan* 49 (G), in 1882 (S); Scott Creek, Lake Co., *Tracy* 2377, type of var. *venosum* (C); Butts Cañon, Napa Co., *K. Brandegee* in 1911 (C); Placer Co., *Jones* in 1882 (Po); Placerville to Eldorado, *Abrams* 6850 (S); Mt. Auburn, *Gross* 231 (S); Doxtaters, *Gross* 118 (Ph).

A. cornutum var. *typicum* occurs mostly in the Sacramento Valley while the var. *leptaleum* is in the San Joaquin Valley. The characters given by Gray in his description of *leptaleum* scarcely seem sufficient for specific distinction, especially since various intermediate conditions are to be found. The South Fork specimen cited above has the small filaments narrow for *typicum*, but the large ones are pubescent toward the tips. A collection at Mariposa, *Congdon* in 1898 (C) has the short filaments broad but all glabrous. A collection from Big Tree Grove, Yosemite *Lemmon* (F), which comes from the region for *leptaleum*, has the the large filaments pubescent. Another intermediate is from Rush Creek Mill, Fresno Co., *McCardle* in 1895 (Ca).

A. emarginatum Eastw. is, I am confident, merely an ecological form with wider leaves than normal. Even narrow-leaved plants tend to have some emarginate leaves and the tendency becomes quite marked when the leaves widen. I have seen but two specimens that had been referred to *emarginatum*: the type from Fresno, *Jenney* 216 (Ca), which has the flowers of *leptaleum*, with the shorter filaments narrow and with all quite glabrous. The other plant was a single one mounted on the same sheet with several plants of *typicum*, Chico, *Bidwell* in 1878 (G). This plant had been labelled

"*emarginatum*" by Miss Eastwood. But it has the flowers of *typicum*, with all fertile filaments dilated and pubescent.

6b. **A. cornutum** var. **leptaleum** (Gray), n. comb.

A. leptaleum Gray, Proc. Am. Acad. 7:373. 1868. Bot. Calif. 1:549. 1876. Syn. Fl. N. Am. 2:252. 1888. Eastwood, Sierra Club Pub. 27:58. 1902. *A. emarginatum* Eastw., Bull. Torrey Bot. Club 32:214. 1905. Jepson, Man. Calif., 901. 1925. *A. cornutum* of Dur. & Hilg., Pac. R. R. Surv. 5:11, pl. 10. 1855, Jepson, Man. Calif., 898. 1925, in part.

Filaments glabrous except at genicula, shorter ones scarcely dilated toward tip; style ca. 4 mm. long and scarcely equal to length of capsule.

Type locality: Clarks Ranch, Mariposa Co., Calif. Material studied; all from CALIFORNIA: Clarks, *Bolander 4983*, type collection, (F, G, US), *Sullivan & Gray in 1872* (G); Mariposa, *Lemmon 1* (C), 35 (M), *Congdon 459* (G); Merman Bar, *Congdon in 1903* (M); Darrah, *Congdon 35* (S); Sequoia Mills *T. S. Brandegee in 1892* (F, rather broad leaves); Pohona Trail, Yosemite, *Michaels in 1922* (Ca); Wawona, *Kelly in 1916* (C); Toll House, Fresno Co., *Hall & Chandler 2* (C); Pose Creek, *Hermann* (Ph, US).

7. **ANTIRRHINUM COULTERIANUM** Benth. in D. C., Prodr. 10:592. 1846.

Gray, Proc. Am. Acad. 7:374. 1868. Bot. Mex. Bound. Survey, 111. 1859. Bot. Calif. 1:549. 1876. Syn. Fl. N. Am. 2:252. 1888. Abrams, Fl. L. A., 358. 1904 and 329. 1917. Armstrong, W. Wildflowers, 468. 1915. Davidson & Moxley, Fl. So. Calif., 325. 1923. Davidson, List Pls. L. A. Co., 13. 1892. Cat. Pls. L. A. Co., 22. 1896. McClatchie, Fl. Pasadena, 642. 1895. Parsons & Buck, Wildflowers Calif., 42. 1921. *A. nivenianum* Gray, Bot. Gaz. 9:53. 1884. *A. nevianum* Gray, Syn. Fl. Am. Suppl., 438. 1888. Davidson & Moxley, Fl. So. Calif., 325. 1923. *A. coulterianum* var. *nevianum* Jepson, Man. Calif., 899. 1925.

Erect annual, 3-12 dm. high, glabrous except in inflorescence, with fairly coarse main stem, simple below and with numerous slender tortile branchlets above, these 5-15 cm. long, often supporting itself on adjacent vegetation, larger branches sometimes ascending and floriferous; leaves very scattered, with midrib ending in glandular swelling, lower ones opposite, ovate to ovate-lanceolate, obtuse, lower leaf-blades 1-3 cm. long, petioles 1-2 cm. long, main cauline leaves lanceolate, alternate, obtusish, 2-9 cm. long, 3-10 mm. wide, short-petioled to subsessile, upper cauline gradually reduced, linear; inflorescence a dense spicate raceme, 5-30 cm. long, subsecund, densely glandular-villous, with herbaceous glandular-pubescent lanceolate or linear bracts, pedicels 2-3 mm. long, glandular-pubescent; calyx herbaceous, glandular-villous, especially without, 5-parted, the segments subequal in length, 3-4 mm. long, swollen-glandular at the tips, the dorsal segment linear-lanceolate, the others lanceolate to lance-ovate; corolla white to bluish, often with darker reticulate veining, with yellowish palate, pubescent without, 9-14 mm. long, corolla-tube cylindrical, 5-7 mm. long, 1.5-2 mm. wide, glabrate within, with broad saccate spur ca. 1 mm. long, upper lip 3.5-6 mm. long, reflexed, with its edges bent back, and with the ovate lobes ca. half as long as the lip itself, lower lip forming large part of the flower, spreading and deflexed, 4-7 mm. long, the great palate minute glandular-puberulent, the 3 lobes subequal, rounded, slightly over one-third length of the lip and somewhat wider than long; stamens didynamous, ca. as long as corolla-tube, strongly dilated toward tip, glabrous except for short pubescence at genicula, anther-sacs confluent, divergent, 5th stamen very rudimentary; pistil about as long as stamens, glandular-villous except near somewhat swollen entire stigma; capsule 6-8 mm. long, glandular-pubescent, cylindric-ovoid, tipped with persistent style 3-4 mm. long, dehiscing by 2 well-formed anterior subterminal pores; seeds dark, ovoid, almost 1 mm. long, with many high ridges passing almost unbroken from one end of seed to other and parallel to each other, or anastomosing and forming a reticulate condition.

Type locality: California. Material studied; CALIFORNIA: without locality, *Coulter* 607 (G, type collection), *Parry & Lemmon* 289 (F, G, M, NY, Ph), *Vasey* 448 (F), *Palmer* 321 (US); Blochmans near Santa Maria, *Eastwood* 486 (Ca); Gavilan Mts., *Hall* 579 (C); Simi, Ventura Co., *Hall* 3243 (C, F, Po); Oakgrove Cañon, Liebre Mts., *Abrams & McGregor* 396 (G, NY, S, US); Kings Cañon, *Dudley & Lamb* 4394 (Po, S); Ojai, *Peckham in* 1866 (G, US); Elizabeth Lake, *Grinnell* 455 (US); Saugus, *K. Brandegee in* 1909 (C); Cahuenga Mts., *Braunton* 263 (US); San Fernando, *Eastwood* 3126 (Ca, US); Los Angeles, *Wallace* (G), *Hasse in* 1888 (US), *in* 1890 (US), 4067 (NY); Sherman, *Braunton* 4 (US); Tujunga Wash, *Grinnell* 504 (US); Redondo, *Braunton* 262 (US); Ballona Harbor, *Abrams* 1674 (Po, S); Monta Vista, *Abrams* 1394 (Po, S); Sierra Santa Monica, *Hasse in* 1889 (M); Laurel Cañon, *Grant* 2530 (S); Garvanza, *Eastwood* 63 (Ca, G, US); Pasadena, *McClatchie in* 1893 (NY), *Jones in* 1904 (Po); Oak Knoll, *Braunton* 746 (US); Eaton Cañon, *Grinnell in* 1907 (F), *Mrs. Thurber in* 1890 (F); Rubio Cañon, *Peirson* 188 (G); Eagle Rock Cañon, *Moxley* 222 (Ca); San Gabriel Cañon, *Munz* 9449 (Po), *Eastwood* 8975 (Ca, G); Glendora, *Grant* 4973 (S); Covina, *Grant* 49, *July* 1904 (F, G, M, Ph); Claremont, *Chandler in* 1897 (C), *Baker* 5244 (C, Po, S); Santiago Mt., *Abrams* 1790 (Po, S); Santa Ana Mts., *Munz* 7106 (Po); Santa Ana River Cañon, *Munz, Street & Williams* 2623 (Po, S); Lytle Creek Cañon, *Hall* 1410 (C, M, Po, S), *Street in* 1918 (Po); Mohave Desert, *Saunders in* 1906 (Ph), *Palmer* 321 (M); Cajon Pass, *Jones in* 1903 (Po); Deep Creek, San Bernardino Mts., *Abrams & McGregor* 720 (NY, S); San Bernardino Mts., *Vasey* 448 (Ph, US); Clarks, San Bdn. Mts., *Jones in* 1900 (Po); Arrowhead Springs, *Fritchey* 57 (M); San Bernardino, *Parish* 3658 (C, G, M, US), *Parish* 5261 (F), *in* 1898 (NY), *Wright* (M), *S. B. & W. F. Parish in* 1888 (M, NY), 257, *in* 1886 (C, F, M, S, US), *in* 1890 (M), *Parish* 11145 (C), *Orcutt in* 1882 (M); Colton, *Jones* 3199 (Ca, M, NY, Ph, Po, US), *Pringle in* 1882 (F, M, Ph, NY, US); Mentone, *Eaton* (G), *Williamson in* 1904 (Ph);

Reche Cañon, *Hall in 1899* (NY); Idyllwild, Riverside Co., *Spencer in 1921* (Po), *in 1923* (Po); Poppet Flat, San Jacinto Mts., *Munz & Johnston 8839* (Po); Whitewater, *Munz & Keck 4999* (Po), *Jones in 1903* (Po); Lakeview, *Johnston in 1920* (Po); San Jacinto Valley, *Reinhardt in 1897* (C); Box Springs Mt., *Reed 1293* (F); Menifee, *King in 1893* (C); Elsinore, *McClatchie in 1892* (NY); Jurupa Hills, *Wilder 183* (Po); Oak Grove, San Diego Co., *Jones in 1900* (Po); Palomar, *Hall 1956* (C, US), *Chandler 5408* (NY), *Munz 8215* (Po); Warners Springs, *Coombs in 1911* (Ca, G, M, NY, US); San Felipe Valley, *Hill, Keck, McCully 61* (Po), *Brandeggee in 1894* (C); Banner, *Hill, Keck, & McCully 142* (Po); Witch Creek, *Alderson in 1894* (G, S); Santa Ysabel, *Antisell 168* (NY), *Collins & Kempton 252* (US), *Munz 9812* (Po); San Luis Rey River, *Street in 1917* (Po); Aguanga, *Munz 9844* (Po); Dripping springs, *Munz 9835* (Po); Fallbrook, *Davidson 3594* (Po); Escondido, *Parish 9115* (S); Descanso, *T. S. Brandeggee* (C); San Pasqual, *Thurber 592* (G, NY); Del Mar, *T. S. Brandeggee in 1894* (C), *Angier 161* (M); Soledad, *Angier 27* (M); Mesa, *Collins & Kempton 65* (US); San Diego, *Orcutt 139* (G), *Orcutt in 1883*, part of type of *Orcuttianum* (G), *Cleveland in 1884* (G, S), *Spencer 7, in 1916* (C, G, Ph, US), *Cleveland in 1874* (G), *Spencer & Woodcock 2320* (G); 40 mi. n. of San Diego, *Orcutt 140*, part of type of *Orcuttianum* (G); Talleys Palmer *in 1875* (G); Lions Valley, *Munz & Hilend 7967* (Po); Tecate Mt., *Munz & Hilend 8025* (Po); Potrero, *Orcutt in 1890* (US), *in 1882* (G); Chollas Valley, *Orcutt in 1884* (F, NY, US), *Cleveland in 1884* (C), *Orcutt 998* (G, M, Ph), *Stokes in 1895* (S); Alpine, *Collins & Kempton 117* (US), *K. Brandeggee in 1905* (C), *Parish 4427* (F, G, M, NY, S, US); Campo, *Abrams 3588* (F, G, M, NY, S); Jacumba, *Schoenfeldt 3357* (US), *Munz 9617* (Po); Buckmans Springs, *Munz 9643* (Po), *Campbell 25* (Ca, US); Laguna Mts., *Spencer 7, in 1920* (Po), *Mearns 3660* (S, US), *McGregor 106* (S), *896* (S); Cuyamaca Mts., *Palmer 270* (F, M, NY), *Eastwood, 9158* (Ca); *Brandeggee in 1894* (C), *in 1896* (C, NY);

LOWER CALIFORNIA: Nachoguero Valley, *Mearns* 3398 (US), 3476 (US), 3495 (US); Burro Cañon, *Brandegee in 1893* (F); Tecate, *Munz* 9488 (Po), 9507 (Po).

In general, there are some slight geographic tendencies to variation in this species, but they are so poorly defined as hardly to merit taxonomic recognition. For instance, in the valleys south of the San Gabriel and San Bernardino Mts., occur plants with the largest flowers, 13-15 mm. long, and with the largest, thickest capsules, 8-9 mm. long. To the north and especially to the south of this general region, the flowers are smaller, 8-10-12 mm. long, and the capsules slightly more slender and 7-8 mm. long. And, from the Cuyamaca Mts. south and west, there is a definite tendency for bluish flowers, while, to the north of the Cuyamacas and Fallbrook and Del Mar, the flowers are mostly whitish. In the material cited above, such collections as *Johnston's* at Lakeview, *Munz* 9835, 9844, 9617 are quite intermediate. The most of the specimens cited above from Fallbrook, Escondido, Soledad, San Diego, Alpine, Tecate, Potrero, etc., are quite blue-flowered and may be referred to *A. coulterianum* forma *orcuttianum** (Gray) n. comb. To my way of thinking *orcuttianum* cannot deserve more than such rank; I have spent much time trying to work out characters that would enable me to maintain *orcuttianum* as a concept of higher rank. Flower-size as used by Gray is of small consequence, *Munz & Hilend* 8025, for example, having blue but much larger flowers than do many of the white-flowered plants. The relative lengths of upper and lower lips vary widely. Nor do the seed-characters used by Gray help. At the time that Gray died there was at the Gray Herbarium only one sheet of the large and white-flowered plants that had seeds of any maturity (*Parry & Lemmon* 289); this particular specimen has the seeds less deeply pitted than usual. The bulk of the large white flowered more northern plants have seeds quite indistinguishable from the blue-flowered more southern ones. The *Nevin* specimen from Capistrano, for which Gray

* *A. orcuttianum* Gray. Bot. Gaz. 9: 53. 1884. Syn. Fl. N. Am. Suppl., 438. 1888. Bailey, Cyclop. Hort. 1: 304. 1914. Orcutt, Fl. So. & Lower Calif., 8. 1885. Parsons & Buck, Wildflowers Calif., 42. 1921. Davidson & Moxley, Fl. So. Calif., 325. 1923.

made the species *nevianum*, seems to differ only in the seeds being ridged instead of pitted. This condition is to be found in many other plants, usually both kinds of seeds coming from the same capsule: *Eastwood* 8975, *Hall* 1410, *Abrams* 1394, *Spencer* 2165, *Wilder* 183, *Munz* 7106, and *Abrams* 1674. The tendency is so indefinite and so poorly correlated with any definite flower-size, geographic distribution, or other matter, that I cannot accept it as of any value.

8. *ANTIRRHINUM NUTTALLIANUM* Benth. in D. C., Prodr. 10:592. 1846.

Gray, Proc. Am. Acad. 7:374. 1868. Syn. Fl. N. Am. 2:253 and 438. 1888. Bot. Calif. 1:550. 1876. Mex. Bound. Survey, 111. 1859. Greene, Bull. Calif. Acad. 1:226. 1885. 2:408. 1887. Brandegee, Proc. Calif. Acad. II, 1:215. 1888. Orcutt, Fl. So. and Lower Calif., 8. 1885. Davidson, List Pls. L. A. Co., 13. 1892. Cat. Pls. L. A. Co., 22. 1896. McClatchie, Fl. Pasadena, 642. 1895. Pennell, in Field Mus. Pub. Bot. 5:222. 1923. Davidson & Moxley, Fl. So. Calif. 325. 1923. Abrams, Fl. L. A. 358. 1904. 329. 1917. Jepson, Man. Calif., 899. 1925. *A. nuttallianum* var. *effusum* Gray. Bot. Calif. 1:622. 1876. Syn. Fl. N. Am. 2:253. 1888. Davidson & Moxley, l. c. Jepson, l. c. *A. subsessile* Gray, Bot. Gaz. 9:53. 1884. Syn. Fl. N. Am. 2:432. 1888. Brandegee, Proc. Calif. Acad. II, 2:190. 1889. Orcutt, Fl. So. and Lower Calif., 8. 1885. Vasey & Rose, Contr. U. S. Nat. Herb. 1:18. 1890. Abrams, l. c. Davidson & Moxley, l. c. *A. nuttallianum* var. *subsessile* Jeps., Man. Calif., 899. 1925.

Annual or biennial, erect and simple, or erect and with ascending branches, or ascending and clambering through adjacent plants by the tortile, more or less horizontal branchlets, generally diffusely branched, stems leafy, softly viscid glandular-pubescent to glandular-pilose, 1-10 (12) dm. high; leaves mostly alternate (lowest frequently opposite), entire, ovate to subcordate, acute to obtuse, glandular-pubescent, blades 0.5-4 cm. long, 2-20 mm. wide, gradually reduced up the stem and becoming ovate bracts in the inflorescence, petioles glandular-

pubescent, 1 or 2 to 8 or 10 mm. long; inflorescence glandular-pubescent throughout, 5-30 cm. long, varying from simple lax raceme to fairly dense paniculately branched raceme, bracts green, ovate, acute, sessile or petiolate, 2-12 mm. long, pedicels 5-20 mm. long, mostly capillary, ascending, spreading, or tortile; calyx oblique, herbaceous, glandular-pubescent, 3-5 mm. long, 5-parted into lanceolate or ovate segments, these subequal or the dorsal one longest, slightly enlarged in fruit; corolla violet-blue, tube deep lavender, palate bright yellow and more or less reticulate, corolla 10-12 mm. long, glandular-pubescent without, corolla-tube cylindrical 4.5-6 mm. long, 2.5-3.5 mm. wide, merely gibbous at base, glabrous within except along 2 lines extending downward from palate, upper lip 4-5 mm. long, suberect, arched, the 2 lobes oblong ovate, ca. 1.5 mm. long, bent upward back to back, lower lip 5-6 mm. long, erect, with depressed oblong-ovate lobes ca. 2 mm. long, palate large and with 2 bands of yellowish tack-shaped hairs running into throat; stamens didynamous, filaments somewhat dilated, glabrous except at short-pubescent genicula 7 and 8 or 8 and 9 mm. long, anther-sacs divergent, confluent, scarcely 0.5 mm. long, 5th stamen very rudimentary; pistil equaling stamens, glandular-pubescent except at glabrous, pointed, slightly curved, simple stigma; capsule cylindric-ovoid, narrow above, glandular-pubescent, oblique, 6-8 mm. long, 3.5-4.5 mm. wide, tipped with persistent inclined style, dehiscence by 2 well formed pores at front of base of style (sometimes additional one back of style); seeds ca. 0.6 mm. long, subcylindrical, dark, alate- or cristate-costate.

Type locality: San Diego. Material studied from CALIFORNIA: without locality, *Coulter 599* (G), *Parry & Lemmon 291* (F, M, NY), *Armstrong 744* (NY); Santa Barbara, *Nuttall* (Ph); Santa Cruz Island, *Ford in 1887* (G), *Brandeggee in 1888* (C), *Niedermueller in 1908* (C), *Eastwood 6398* (Ca); Santa Monica Mts., *Hasse 4635* (NY), *in 1890* (Po, US); Los Angeles, *Wallace* (G), Los Angeles Cañon, *Bolander in 1860-67* (US), *in 1873* (G); Ballona, *Braunton 435* (C, NY, US) *in 1902* (S), *Abrams 1681* (NY, Po, S); Catalina Island, *Trask in 1901* (NY, US), *Trask in 1898*

(US), *Schumacher in 1874* (G), *K. Brandegee in 1916* (C), *Smith 5084* (F), *Nuttall 240* (F), *491* (F), *697* (F), *Reed in 1909* (F); Playa del Rey, *Abrams 2496* (C, G, M, NY, Ph, Po, S, US); San Bernardino, *Parish 4757* (NY, S, US), *4746* (S, Po), *4190* (C, G, M, NY, US); San Bernardino foothills, *S. B. & W. F. Parish 258* (C); Highland, *Parish 4615* (C, F, NY, Ph, Po, S), *2056* (S); City Creek, San Bdn. Mts., *Smith 1* (C); Box Springs Cañon, Riverside Co., *McClatchie in 1892* (NY), *Reed 801* (US), *Johnston in 1920* (Po); Lakeview, *Johnston in 1920* (Po); Riverside, *Hall 1709* (C), *Hall in 1897* (C); Whitewater, *Jones in 1903* (Po); Menifee, *King in 1893* (C); Murietta, *Munz & Johnston 5352* (Po); Fallbrook, San Diego Co., *Munz & Harwood 3901* (Po, S); San Luis Rey, *Street 1931* (Po); Santa Ysabel, *Munz & Harwood 7308* (Po); Henshaw *5* (US), *8* (US); Lakeside, *Hall 7441* (C), *T. S. Brandegee in 1888* (C), *in 1906* (C); Del Mar, *Parish 1833* (M, NY), *4433* (C, G, M, S, US), *T. S. Brandegee in 1894* (C), *Street in 1917* (Po); Ramona, *Brandegee in 1894* (C); Soledad, *Engelmann in 1880* (M); La Jolla, *F. E. & E. S. Clements 112, 113, 114, 115* (F, G, M, NY, Ph); Torrey Pines, *Spencer 908, in 1918* (G, Ph, Po); San Diego, *Orcutt in 1884* (F, G), *Cleveland in 1874* (G), *Cooper in 1862* (G), *501* (US), *Orcutt 164* (G), *Jones 3150* (F, NY, US), *Palmer 268* (C, M, NY), *288* (US), *Pringle in 1882* (F, NY, Ph, US), *Parry in 1850* (NY), *Vasey 449* (Ph, US), *in 1880* (US), *Brandegee in 1903* (US), *Hall 3928* (C, M), *Evans 20* (M), *Parish 6801* (S), *Grant 6801* (S), *Nuttall* (Ph), *K. Brandegee* (M, Ph, US), *Thurber 567* (G, NY); Bernardo, *Abrams 3383* (F, G, NY, S); Foster, *T. S. Brandegee in 1894* (C, S); El Cajon, *T. S. Brandegee in 1904* (C), Lemon Grove Road, *Chandler 5296* (S); Chula Vista, *Collins & Kempton 53* (US); Pacific Beach, *Collins & Kempton 61* (US); Coronado, *Collins & Kempton 106* (US), *Dunn in 1891* (S); Agua Hedionda, *Peirson 3415* (Po); Mission Beach, *Street 1930* (Po, S), *Millsbaugh 4426* (F); Point Loma, *T. S. Brandegee in 1895* (C); Mearns *4039* (US); Dulzura, *T. S. Brandegee in 1904* (C); Barrett Dam, *Munz & Hilend 7992* (Po); Pala Grade,

Munz 8200 (Po); Tecate Mt., Munz & Hilend 8006 (Po), 8025 (Po); Jamul Valley, Palmer in 1875 (F, G, Ph), Mearns 3830 (G, NY, US); Chollas Valley, Orcutt 997 (G, M), in 1884 (F, C); San Miguel Mt., Chandler 5276 (NY); Carizo Creek, Brandegee in 1893 (C); San Clemente Island, Nevin & Lyon 16 (G), Trask 243 (US), 244 (NY, US), Munz 6766 (Po).

ARIZONA: Santa Catalina Mts., Lemmon 257 (G); Tucson, Lemmon 167 (G), Tucson & Lowell, W. F. Parish 177 (F, G, S); Hot Springs, Toumey 220 (S); Sierra Tucson, Pringle in 1884 (F, M), 4834 (NY, Ph); Sabenio Cañon, Griffiths 2528 (NY).

LOWER CALIFORNIA: San Telmo, Orcutt in 1886 (F, M, US), T. S. Brandegee in 1893 (C); Ensenada, Jones in 1882 (NY); San Pedro Martir, T. S. Brandegee in 1893 (C); San Quentin, Palmer 735 (F, G, NY, Ph); San Martin Island, Stewart in 1906 (Ca); Guadalupe Island, T. S. Brandegee in 1897 (C), Brown 24 (G), 25 (G), 38 (G), in 1906 (C), Drent in 1898 (C), Palmer 56 (G, M, NY, Ph); Caysito, Orcutt in 1883 (G).

So far as I can see *subsessile* and var. *effusum* are ecological and of no taxonomic value. Plants growing among shrubs and other vegetation become very effuse, especially in the second year of growth. Plants in rather exposed conditions tend to have thickened, short-petioled leaves. There is a tendency toward cleistogamy especially in the southern part of the range; plants having this condition are Brandegee's *pusillum*, which is nothing more than a small-flowered, depauperate form of *Nuttallianum* and which may be known as *A. nuttallianum* forma *pusillum** (Brandegee) n. comb. Here are to be referred the following: Todos Santos Island, Brandegee in 1897 (C); San Martin Island, Anthony 225 (C, F, S, US); Guadalupe Island, Brandegee in 1897 (C); Cedros Island, Palmer 725 (US); Point Loma, Brandegee in 1895 (C).

* *Antirrhinum pusillum* Brandegee, Univ. Calif. Pub. Bot. 6:360. 1916.

9. *ANTIRRHINUM SUBCORDATUM* Gray. Proc. Am. Acad. 20:306. 1884.

Syn. Fl. N. Am. 2:438. 1888. Jepson, Man. Calif., 900. 1925.

Coarse, diffusely branched, annual, bright green herb, at least 3 to 7-8 dm. high, pilose-hispid below, glandular-pubescent above, main branches up to 4 dm. long, secondary and minor ones numerous, filiform, tortile; leaves numerous, close, ovate, subcordate, sessile to subsessile (lowest apparently petioled), glabrate, entire, obtuse or emarginate, with conspicuous glandular swelling at end of midrib, 10-45 mm. long, 5-35 mm. wide, with 3-several main longitudinal veins, leaves reduced upward; lower flowers solitary and axillary, upper in a leafy spicate raceme and in same axils with spreading tortile branches, subsessile; calyx sparsely glandular-villous, herbaceous, 5-parted, the upper segment ovate to elliptic-orbicular, truncate to emarginate, 10-20 mm. long, several ribbed, the middle rib ending in a gland, lateral and ventral segments subequal, linear-lanceolate, 6-10 mm. long, acuminate; corolla 16-18 mm. long, glandular pubescent without, corolla-tube 9-10 mm. long, subcylindric, with basal saccate spur 1.5-2 mm. long, pubescent within from base of lower lip, upper lip reflexed, ca. 6 mm. long, with slight palate-like enlargement, the 2 lobes rounded, ca. 1.5 mm. long and 2.5 wide, lower lip ca. 7 mm. long, the middle lobe ca. 2.5 mm. long, ovate, others shorter and wider, palate large and glandular-pubescent; fertile filaments didynamous, glabrous except for sparse coarse pubescence at genicula, longer filaments widely dilated, ca. 10 mm. long, shorter less so and 9 mm. long, anther-sacs divergent, confluent, each ca. 1 mm. long, 5th stamen very rudimentary; pistil about as long as shorter stamens, glandular-pubescent except at pointed, unequally and slightly bifid tip; capsule ca. 8 mm. long, 4.5 wide, ovoid, with deflexed style, glandular-pubescent, dehiscent by 2 pores; seeds ovoid, ca. 1 mm. long, reticulate-favose.

Type locality: Stony Creek, Colusa Co., California. Material studied, from CALIFORNIA: Alder Springs, Glenn Co., Heller 11462 (Ca, G, F, M, NY, S); Stony Creek, Colusa Co.,

Rattan 47, type collection (C, G, S); Calaveras Valley, *Brandegee* (C); without locality, *Klee* (C). The last two named are somewhat intermediate with *A. vexillo-calyculatum* Kell. More material may show that *A. subcordatum* is only a variety of that species.

10. ANTIRRHINUM VEXILLO-CALYCVLATUM Kellogg, Proc. Calif. Acad. Sci. 1 (ed. 1) :27. 1855. Curran. Bull. Calif. Acad. 1:144. 1885.

Erect or ascending annual, simple below, diffusely branched above, the main branches floriferous, 1.5-4.5 dm. long, the smaller branchlets filiform and tortile, 3-10 cm. long, main stem sparsely hispid-pilose below, increasingly so upward, glandular-pilose in the inflorescence (or even throughout); lowest leaves opposite, others alternate, most not crowded, glabrous to glandular-pilose, entire, ovate to lanceolate, to oblong-lanceolate, blades 1-6 cm. long, 0.5-2 cm. wide, obtuse to almost truncate, 3-5 veined, midrib ending in a glandular swelling, leaves gradually reduced in inflorescence, petioles glabrous to glandular-pilose, 2-35 mm. long, leaves of tortile branchlets ovate to orbicular-ovate to orbicular, less than 1 cm. long, subsessile; flowers of smaller plants borne singly in fairly low axils, but mostly in terminal more or less leafy and often branching, glandular-pubescent, spicate racemes 5-30 cm. long, pedicels ascending, 2-5 mm. long, more or less glandular-pubescent; calyx glandular-pubescent, herbaceous, in flower 4-12 mm. long, 5-parted, segments variable, from almost subequal to the upper broad and much exceeding others, truncate to obtuse to acute, slightly enlarged in fruit; corolla "light-purple," 10-16 mm. long, glandular-pubescent without, corolla-tube with basal saccate spur 1-2 mm. long, subcylindric, 8-10 mm. long, 2-3 wide, glabrate within, upper lip reflexed, arched, 2.5-4 mm. long, lobes oblong-ovate to oblong-lanceolate, lower lip erect, 4-6 mm. long, the high palate slightly glandular-pubescent, the 3 lobes oblong-ovate, 2-3 mm. long; fertile filaments didynamous, very oblique-dilated, weakly glandular-puberulent toward tips, ca. 7 and 8 or 8 and 9 mm. long, some-

what coarsely pubescent at genicula, dilated below as well as at tip, 5th stamen very rudimentary; pistil equal to shorter stamens, glandular-pubescent except at very tip, stigma unequally bifid; capsule oblique, ovoid, glandular-pubescent, with deflexed persistent style, 4-6 mm. long, 2-3 wide, dehiscing by 2 pores; seeds ovoid, ca. 1 mm. long, the winged ridges fimbriate and anastomosing to form reticulate-favose condition.

10a. ***A. vexillo-calyculatum* var. *typicum***, nom. nov.

A. vexillo-calyculatum Kell., l. c. *A. vagans* Gray, Proc. Am. Acad. 7:375. 1868. Syn. Fl. N. Am. 2:253. 1888. Bot. Calif. 1:549. 1876. Wats., Bot. King Exp., 216. pl. 21, fig. 5. 1871. Bolander, Cat. Pls. San Fran., 21. 1870. Rattan, Pop. Calif. Fl., 90. 1880. Behr, Fl. Vic. San Fran., 153. 1888. Anderson, Nat. Hist. Santa Cruz Co., 41. 1894? Jepson, Fl. West. Mid. Calif., 371. 1912. 396. 1901. Man. Calif., 900. 1925. Parsons & Buck, Wildflowers Calif., 326. 1921. Greene, Man. Bot. San Fran. Bay, 271. 1894. Armstrong, Western Wildflowers, 470. 1915. *A. vagans* var. *bolanderi* Gray, Proc. Am. Acad. 7:375. 1868. Bot. Calif., 1:550. 1876, in part. Syn. Fl. N. Am. 2:253. 1888, in part. Bolander, l. c. Rattan, l. c. Jepson, Fl. West Mid. Calif., l. c. *A. coulteri-anum* var. *appendiculatum* Dur. & Hilg. Pac. R. R. Rep. 5:11. pl. 11. 1855. *A. vagans* var. *rimorum* Jepson, Man. Calif., 900. 1925.

Stems generally glabrate at base, with scattering pilose hairs, glandular-pilose in inflorescence; flowers 13-15 mm. long; calyx-segments strongly differentiated and at least two-thirds as long as corolla-tube, dorsal segment 8-12 mm. long, broadly elliptic to narrowly ovate, others 7-8 (10) mm. long, linear-lanceolate.

Type Locality: Point Reyes, Marin Co., California. Material studied, CALIFORNIA: without locality, *Fremont 495* (G, M, NY); *Bridges 192* (G, NY, US); Santa Rosa, *Kuntze 23130* (NY); between Knights Valley and Mark West Springs, *Heller 5788* (F, G, M, Ph, NY, S, US); Knights

Valley, *Edwards in 1877* (NY); Sonoma Creek Cañon, *Baker in 1904* (C); Russian River near Duncans Mills, *Baker in 1899* (US); Ukiah, *Eastwood 3393* (Ca, US); Cloverdale, *Rattan in 1877* (S); Kenwood, *Davy 867* (C); Petaluma, *Congdon in 1880* (C); Calistoga, *Wright in 1921* (Ca); Atlas, *Wilson in 1920* (Ca); Marin Co., *Bolander 2479* (G, US) is Gray's var. *Bolanderi*; Mill Valley, *Eastwood in 1894* (G); Tamalpais, *Michener & Bioletti 74* (G), *Sutcliffe in 1920* (Ca, Ph); K. *Brandegee in 1905* (C), *Eastwood 11500* (Ca); Lily Lake, *Sutcliffe in 1923* (Ca); Paper Mill Creek, *Congdon in 1880* (C); between Ross Valley and Bolinas Ridge, *Eastwood in 1898* (F); Kentfield, *Moore 389* (Ca); Alameda, *Vasey in 1875* (US); Oakland Hills, *Kellogg & Harford 658* (G, M, NY, US), *Torrey 360a* (G, NY), *Davy 7784* (C); Niles, *Jepson in 1897* (G); Rag Cañon, *Brewer 1319* (G, US); New Almaden, *Torrey in 1868* (NY); Berkeley, *Walker 402* (C); Oakland, *Drew in 1888* (C); Tiburon, K. *Brandegee* (C); Concord, *Elmer 4937* (US); Port Costa, *Elmer 4937* (S); Mt. St. Helena, *Jones in 1921* (Ca); Calaveras Valley, *Brooks in 1878* (Ca); San Francisco, *Wilkes Exped., 1439* (US), *Vasey in 1876* (G); Santa Clara, *Bolander 47* (G); Penitence Cañon, *Bush in 1874* (G, US); Gilroy Springs, *Edwards in 1874* (NY); Loma Prieta Peak, *Elmer 4983* (M, NY, S, US), *Dudley in 1893* (S); Black Mt., *Randall 376* (S), *Baker 1543* (Ca, Po); Santa Cruz, *Bolander 47* (M); Saratoga, *Pendleton 218* (C); Congers Springs, *Williamson in 1905* (Ph); Cholame Valley, *Lemmon* (F); San Juan Baptista Hills, *Dudley in 1895* (C, Ca, M, G, NY, S); Posa Creek, *Heermann in 1853* (Ph, US), the *A. Coulterianum* var. *appendiculatum* of Dur. & Hilg.; Saugus?, T. S. *Brandegee* (C).

Although no specimen or drawing is extant for original material of Kellogg's *verillo-calyculatum* from Point Reyes, his detailed description fits very closely the species that has so long gone under the name of *vagans*. The only thing with which it could possibly be confused is *subcordatum*, but I have seen no specimens of that species from the same region. There is a tendency for shade plants of *verillo-calyculatum* to have

the calyx somewhat enlarged. This is especially true in the region of Marin Co., for example, *Bolander* 279 and the *Eastwood* specimen from Mill Valley. Such plants constituted Gray's var. *bolanderi*, but so far as I have seen such, they seem to be shade plants and not worth nomenclatorial recognition.

10b. ***A. vexillo-calyculatum* var. *breweri* (Gray), n. comb.**

A. breweri Gray, Proc. Am. Acad. 7:374. 1868. Syn. Fl. N. Am. 2:253. 1888. Gray, in Bot. Calif. 1:550. 1876. Bolander, Pls. San Fran., 21. 1870. Rattan, Pop. Calif. Flora, 90. 1880. *A. vagans* Gray. var. *breweri* Jepson, Fl. W. Mid. Calif., 371. 1912. 396. 1901. Man. Calif., 900. 1925. *A. breweri* var. *ovalifolium* Gray, Proc. Am. Acad. 7:375. 1868. *A. vagans* var. *bolanderi* Gray, Syn. Fl. N. Am. 2:253. 1888 in part. Gray, in Bot. Calif. 1:550. 1876, in part.

Stems generally quite glandular-pubescent throughout; flowers 10-12 mm. long; calyx-segments not strongly differentiated and often scarcely more than half as long as corolla-tube; dorsal calyx-segment 4-6 (7) mm. long, ovate-lanceolate, the others 3-5 mm. and linear-lanceolate.

Type locality: "Below Mt. Shasta". Material studied: OREGON: Illohe, *Nelson* 1376 (G); Ashland, *Sheldon* in 1889 (M); Glendale, *Howell* 769 (G), *Howell* in 1887 (C, F, M, NY, Ph, US). CALIFORNIA: Valley of the Sacramento, *Wilkes* 1629 (US); without locality, *Vasey* in 1875 (US); Hornbrook, Siskiyou Co., *Abrams* 9897 (S); Ft. Jones, Scott Valley, *Butler* 2 (Po); Humbug Mts., *Butler* 1569 (C, M, Po); Snow Mt., *T. S. Brandegee* in 1891 (F); Mt. Shasta, *Brown* 547 (M, NY, US), below Mt. Shasta, *Brewer* 1343 (G); Craggy Peak, *Dudley* in 1899 (S); Mad River, Humboldt Co., *Rattan* (S), *Tracy* 4327 (C, US); Willow Creek, *Tracy* 3482 (C), *Abrams* 7171 (S); ridge between Van Duzen & Mad Rivers, *Tracy* 2790 (C, G, US); Yreka, *Greene* 901 (G, M, Ph); Dunsmuir, Trinity Co., *Abrams* 6159 (NY, S); Pitt River, Shasta Co., *Smith* in 1913 (Ca); Pitt to Kennett, *Eastwood* 1473 (Ca, G, NY, US);

Burney Butte, *Eastwood* 1041 (Ca, G, NY, US); Mt. Bullion, *Bolander* 4849 (C, G, US); Delta, *Heller* 11697 (Ca, F, G, M, NY, S, US); Genessee, Plumas Co., *Heller & Kennedy* 8836 (F, G, M, NY, Ph, S, US); Plumas Co., *Ames* in 1874 (G), in 1876 (G, M, Ph); Genessee Valley, *Hall & Babcock* 4444 (C, NY, US), *Clemens* in 1926 (Ca); Spanish Ranch, *Eggleston* 7691 (US); Sierra Co., *Lemmon* in 1874 (G); Sierra Nevada Mts., *Lemmon* in 1875 (US); Colfax, Placer Co., *Jones* 3426 (M, NY, Po, US); Sweetwater Creek, Eldorado Co., *K. Brandegee* in 1908 (C); Ione, Amador Co., *Braunton* 1041 (C, M, NY, US); Long Valley, Mendocino Co., *Rattan* in 1882 (S), *Kellogg & Harford* 657 (M, NY, Ph, US), 659 (G); Twin Rocks, *Eastwood* 10639 (Ca); Orr's Springs, *McMurphy* 290 (S); Newville-Covella Road, *Heller* in 1914 (M, NY, S); Hullville, Lake Co., *Heller* in 1902 (M, NY, Ph, US); Allens Springs, *Cleveland* in 1882 (C); Coast Mts. of Lake Co., *Rattan* in 1882 (S); Clear Lake, *Torrey* 360 (G, NY); Lake Co., *Torrey* 359 (G, NY); Rose Springs, *Gates* in 1879 (C); Little Chico Creek, *Leiberg* 5005 (US); Rawhide, Tuolumne Co., *Williamson* 225 (S); Stockton Creek, Mariposa Co., *Congdon* 134 (S); Coulterville Road, *Congdon* in 1895 (C), in 1897 (S); Cazadero, Sonoma Co., *Congdon* in 1901 (US).

While *typicum* inhabits the "Bay Region", *brevieri* is found to the north and east, and is not always well distinguished from *typicum*. Such specimens as *Heller* 11697, *Bridges* 192, *Torrey* 360, and *Congdon* from Cazadero are quite intermediate in the calyx-condition, flower size and other characters. The type specimen of Gray's *brevieri* var. *ovatifolium* [with *Brewer* 1343 (G)] from Mt. Shasta is a shade form.

11. ANTIRRHINUM KINGII Wats., Bot. King Exped., 215. pl. 21. 1871.

Annual, 1-5 dm. high, erect or ascending, simple at base or with ascending branches, slender, mostly glabrate except for the sparsely tomentose base; inflorescence glandular-puberulent with filiform tortile branchlets usually present in the upper

part; leaves lanceolate to linear, blunt, with a glandular swelling at end of midrib, rather scattered, glabrous, blades entire, 5-35 mm. long, 1-5 wide, upper sessile, reduced to linear bracts, lower narrowed into petioles 3-10 mm. long; flowers axillary even from near base of plant, forming above a lax, racemose inflorescence, usually in same axils with branches, pedicels filiform, glabrate to finely glandular-puberulent, 4-20 mm. long; calyx 3.5 to 4.5 mm. long, glandular-puberulent, 5-parted; corolla 7-8 mm. long, white with purple veins to "violet, white-veined", glandular-puberulent, corolla-tube merely gibbous at base, 3-4 mm. long, 2-2.5 wide, slightly pubescent within from base of palate downward, upper lip 3-3.5 mm. long, suberect, with the 2 rounded lobes ca. 1 mm. long and reflexed, lower lip erect, ca. 4 mm. long, with prominent pubescent palate and deflexed lobes ca. 1 mm. long; fertile stamens didynamous, ca. 4 & 5 mm. long, moderately dilated, pubescent only at genicula, anther-sacs divergent, confluent; pistil equaling shorter stamens, sparsely glandular-puberulent except toward entire tip; capsule oblique, glandular-puberulent, subglobose, ca. 4 mm. long, ending in persistent style which is ca. 3 mm. long, dehiscing by 1 posterior and 2 anterior pores; seeds ca. 0.5 mm. long, ovoid, deeply fimbriate-costate or with irregularly fimbriate wings, or almost alate-tuberculate.

11a. *A. kingii* var. *typicum*, nom. nov.

A. kingii Wats., Bot. King Exped. 215. pl. 21, 1871. Gray, Bot. Calif. 1:550. 1876. Howell, Fl. N. W. Amer. 1:505. 1901. Rydb., Fl. Rocky Mts., 762. 1922. Frye & Rigg, N. W. Flora, 343. 1912. Tidestrom, Contr. U. S. Nat. Herb. 25:485. 1925.

Pedicels 4-6 mm. long in fruit; upper calyx-segments 5-7 mm. long in fruit, oblong-lanceolate, lateral ones 3-4 mm. long, lanceolate; corolla "white".

Type locality: By inference, Washoe Valley, Nevada. Material studied, UTAH: Milford, *Jones in 1880* (F); Salina Cañon, *Jones 5419* (C, NY, Po, US); Leamington, *Jones in 1880* (NY), (Po); Riverside, *Jones in 1880* (Ph, Po, US); Deep Creek, *Jones in 1891* (Po). NEVADA: Candelaria,

Shockley 294 (C, G, S, US); Regans Valley, *Watson 767* (G, NY, US); Reno, *Hillman in 1895* (Po); Unionville Valley, *Watson 767* (G); Trinity Mts., *Watson 767* (NY, US); Goldfield, *Heller in 1913* (G, M, S); Rhyolite, *Jones in 1907* (Po); Reese River Pass, *Watson 767* (NY, US); Hawthorne, *Jones in 1882* (Po); Steamboat Springs, *Stretch in 1865* (NY); Curries, *Jones in 1906* (Po); Hot Springs S. of Reno, *Stokes in 1903* (US); Nevada Basin, *Lemmon* (F); Pyramid Lake, *Lemmon 1130½* (G); without locality, *Lemmon in 1878* (G). CALIFORNIA: Bishop Creek, *Hall & Chandler 7248* (C, Po); Sierra Nevada Mts., *Lemmon in 1875* (US); Argus Mts., *Purpus 5419* (C, G, M, US); White Mts., *Heller 8341* (C, Ca, F, G, M, Ph, NY, S, US), *K. Brandegee* (C); Panamint Mts., *Hall & Chandler 6977* (C); Mammoth, *T. S. & K. Brandegee* (C); Emigrant Springs, *Parish 10635* (S). OREGON: Malheur, *Cusick 1243* (G, Ph, US); Narrows, Harney Co., *Peck 2677* (G). IDAHO: Blue Lakes, Snake Plains, *Palmer 70* (US).

11b. **A. kingii** var. **watsoni** (Vasey & Rose), n. comb.

A. kingii var., Wats., Proc. Am. Acad. 24: 66. 1888. *A. watsoni* Vasey & Rose, Proc. U. S. Nat. Mus. 11:533. 1889. Contr. U. S. Nat. Herb. 1:18. 1890. Brandegee, Proc. Calif. Acad. II, 2:190. 1889.

Pedicels 9-20 mm. long in fruit; calyx-segments subequal and 3-4 mm. long, narrowly lanceolate to linear; corolla "violet, white-veined".

Type locality: By inference, Los Angeles Bay, Lower California. Material studied, SONORA: Northwestern Mts., *Pringle in 1884* (F, G, NY, Ph, US). LOWER CALIFORNIA: San Quentin, *Palmer 657* (F, G, Ph, US); Magdalena Island, *Orcutt 44* (US); San Benito Islands, *Rose 16060* (NY, US); Cedros Island, *Brandegee in 1897* (C, G, M, S, US), *Palmer 714* (G, US); Los Angeles Bay, *Palmer 589* (G, US).

With its more southern range, its longer pedicels and more nearly equal calyx-segments, *watsoni* can be considered a good variety of *kingii*.

12. *ANTIRRHINUM OVATUM* Eastw., Bull. Torrey Bot. Club 32:213. 1905. Jepson, Man. Calif., 900. 1925.

Erect annual, simple or branching from base as well as above, 1-4 dm. high, stems glandular-villous throughout, upper branches slender, few, and not very tortile; rather leafy throughout, leaf-blades ovate, glandular-pubescent or almost glabrate, entire, obtuse to truncate to emarginate, 8-28 mm. long, 6-22 wide, with translucent glandular swelling at end of midrib, main longitudinal veins several, cauline leaves sessile or subsessile, lowest ones narrowed into petioles 1.5-2 cm. long; flowers axillary in a leafy raceme, pedicels 2-3 mm. long; calyx herbaceous, 5-parted, glandular-pubescent, upper segment elliptical, 10-12 mm. long, 5-7 mm. wide, obtuse to emarginate, others subequal, 4-5 mm. long, 1 mm. wide, linear, acute; corolla ca. 2 cm. long, "upper lip pink, lower white", glandular-pubescent without, corolla-tube subarcuate, 7-10 mm. long, with saccate spur at base 2 mm. long and 3 broad, glabrous within and widening abruptly into a broad throat ca. 5 mm. long and widely gaping, upper lip reflexed, ca. 6 mm. long, lobes rounded-truncate, ca. 2.5 mm. long, lower lip reflexed, 7-8 mm. long with smooth low palate and 3 rounded, obscure, deflexed lobes; fertile stamens didynamous, the 2 shorter ca. 10 mm. long, slightly dilated above, glabrous, others ca. 12 mm., more dilate toward tips, glandular-puberulent, all with short hairs at genicula, anthers divergent, somewhat confluent; pistil equaling shorter stamens, glandular-pubescent except at pointed entire tip; capsule oblique, glandular-pubescent, ovoid, 8-9 mm. long, 4-5 wide, style slender, 10-11 mm. long; seeds 1 mm. long, "cuneate, rugose and the rugae muricate".

Known only from the type collection, Carisa plains, McDonald's Ranch, near boundary between Santa Barbara and San Luis Obispo Counties, California, *Eastwood in 1902* (C,

Ca). It is a most remarkable species in its widely gaping corolla.

13. *ANTIRRHINUM FILIPES* Gray, in Bot. Ives Exped., 19. 1860.

A. filipes Gray, Proc. Am. Acad. 7:376. 1868. Bot. Calif. 1:551. 1876. Syn. Fl. N. Am. 2:254 & 439. 1888. Coville, Contr. U. S. Nat. Herb. 4:169. 1893. Orcutt, Fl. So. & Lower Calif., 8. 1885. Tidestrom, Contr. U. S. Nat. Herb. 25:485. 1925. Jepson, Man. Calif., 898. 1925. *A. cooperi* Gray, Proc. Am. Acad. 7:376. 1867. Bot. Calif. 1:551. 1876. Syn. Fl. N. Am. 2:253. 1888. Parry, Amer. Nat. 9:346. 1875. Rydb., Fl. Rocky Mts., 762. 1922. Davidson & Moxley, Fl. So. Calif., 326. 1923.

Climbing, filiform, bright green annual, 3-8 dm. high, glabrous except for slight tomentum at base, diffusely branched below, with branches at first ascending then climbing mostly by the capillary twisting pedicels; lower leaves somewhat clustered, blades ovate, entire, obtuse, 0.5-2 cm. long, on petioles 5-15 mm. long, becoming narrower (lanceolate) and longer (3 cm.) above the base of plant, most cauline leaves reduced to lance-linear sessile green bracts, 5-15 mm. long and at nodes 5-10 cm. apart; flowers solitary, axillary, pedicels 3-8 cm. long; calyx scarcely oblique, herbaceous, obscurely glandular-puberulent, 5-parted into subequal lanceolate lobes ca. 4 mm. long and 1 wide; corolla bright yellow, 11-13 mm. long, glandular-puberulent without, corolla-tube saccate at base, sub-cylindric, ca. 6 mm. long and 3 wide, pubescent within from base of palate downward, upper lip 5-6 mm. long, erect, with broadly ovate-truncate lobes ca. 2 mm. long, lower lip ca. 6 mm. long, erect, with the 3 lobes deflexed, narrowly truncate-ovate and ca. 2.5 mm. long, palate prominent, hairy, yellow with dark spots; fertile stamens ca. 6-8 mm. long, the longer pair dilated, all glabrous except for the coarsely pubescent genicula, anther sacs divergent, confluent; pistil slightly longer than shorter stamens, closely glandular-puberulent except at very tip, this entire and slightly enlarged; capsule globose, 3-5

mm. long, slightly exceeding calyx, very finely glandular-puberulent, tipped with rather persistent geniculate style (6 mm. long), apparently dehiscing irregularly; seeds scarcely 1 mm. long, tuberculate, with corky wing-like outgrowths.

Type locality about thirty-five miles north of Needles, but on the Arizona side of the Colorado River. Material studied. SOUTHERN UTAH: *Parry in 1874* (G). NEVADA: Rhyolite, *Heller 9648* (S); Good Springs, *Jones in 1905* (Po); Charleston Mts., *Jones in 1906* (Po); Lincoln Co., *Davis 53* (M); Amargosa Desert, *Jones in 1907* (Po). ARIZONA: Ft. Mojave, *Cooper in 1861*, type collection of *A. Cooperi* (G, US), *Almendinger* (G); Camp 49, *Newberry* type collection of *filipes* (G, US); Yucca, *Jones in 1884* (Ph, Po). CALIFORNIA: Darwin, *Jones in 1897* (Po); Panamint Mts., *Coville & Funston 525* (G, NY, S, US); Fremonts Peak, Mohave Desert, *Hall & Chandler 6854* (C); Salt Wells Cañon on Searles-Trona Road, *Ferris et al 3903* (S); Randsburg, *Heller in 1905* (Ph); Funeral Mts., *Coville & Funston 459* (US); Providence Mts., *Munz & Harwood 3443* (Po); Needles, *Jones in 1904* (Po); Kelso, *Jones in 1906* (Po); Barstow, *Parish 19232* (C), *Munz 2604* (Po, S), *Spencer in 1922* (Po); Kane Spring, *Hall & Chandler 6822* (C); Colorado Desert, *Spencer 1466* (G, Po); Cottonwood Spring, *Hall 6014* (C, S, US); Ironwood Well, *Brandegge in 1905* (C); Chuckwalla Mts., *Munz & Keck 4868* (Po); Shavers Well, *Munz & Keck 4756* (Po); Coachella, *Hall 5815* (C, S); Yaqui Wells, *Eastwood 2749* (Ca, G, NY, US); Agua Caliente, now Palm Springs, *S. B. & W. F. Parish 1224* (G, S), *1224a* (G); Banner, *Dunn* (C); Mission Cañon, San Diego?, *Orcutt 1046* (G, M).

14. *ANTIRRHINUM STRICTUM* (H. & A.) Gray, Proc. Am. Acad. 7:375. 1868.

Maurandia stricta H. & A., Bot. Beechey, 375. 1840. *Antirrhinum strictum* Gray, Bot. Calif. 1:550. 1876. Greene, Bull. Calif. Acad. Sci. 2:409. 1887. Man. Bot. San Fran. Bay, 271. 1894. Yates, 9th Ann. Rep. State Mineralogist, Calif., 17. Davidson, Pls. L. A. Co., 13, 1892 & Cat. Pls. L. A. Co., 22.

1896. McClatchie, Fl. Pasadena, 642. 1895. Jepson, Fl. West. Mid. Calif., 396. 1901 and 371. 1912. Abrams, Fl. L. A., 358. 1904 & 329. 1917. Heller, *Muhlenbergia* 3:118. 1907. Armstrong, West. Wildflowers, 470. 1915. Davidson & Moxley, Fl. S. Calif., 325. 1923. *A. hookerianum* Pennell in Millspaugh & Nuttall, Field Mus. Pub. Bot. 5:222. 1923.

Annual, glabrous except for sparse white wooliness at base, erect, 3-10 dm. high, fairly stout below, strict or branched, upper portions usually becoming vinelike and climbing by means of the slender twisting petioles; lower heavier part of stem quite leafy, with internodes shorter than leaves, leaves entire, often purplish beneath, midrib ending in glandular thickening, very lowest leaves ovate, obtuse, blades 3-20 mm. long, petioled, next ones lance-ovate to lanceolate, short-petiolate to sessile, 3-6 cm. long, petioles winged; upper vine-like portion of stem with lance-linear to linear leaves, sessile, 5-15 mm. long, and with internodes 20-30 mm. long; flowers solitary in upper axils, pedicels filiform, 3-6 cm. long; calyx slightly oblique, herbaceous or purplish tinged, 5-6 mm. long, 5-parted in lance-linear subequal segments; corolla 13-15 mm. long, blue, glabrate, corolla-tube 7-8 mm. long, gibbous at base, 3-4 mm. wide, slightly arcuate, pubescent within from base of palate, upper lip reflexed, ca. 5 mm. long and as wide, the 2 lobes suborbicular, 2.5-3 mm. long, lower lip erect, ca. 6 mm. long, the 3 lobes 2.5-3 mm. long, suborbicular, deflexed, the palate prominent, densely pubescent; stamens 4.5 & 5.5 mm. long, well dilated, glabrous except at pubescent genicula, anther-sacs confluent, divergent; pistil equaling longer stamens, style very minutely granular-puberulent, 5.5-6 mm. long; capsule globose, glabrous, 6-7 mm. long, slightly exceeding calyx, with style straight, not deflexed, dehiscence irregular; seeds scarcely 1 mm. long, tuberculate with numerous wing-like outgrowths.

Material studied: CALIFORNIA: without locality, *Douglas*, probably type collection, (G); Sequoia Cañon, Marin Co., *Michener & Bioletti in 1892* (C, US); La Honda, San Mateo Co., *Elmer 2413* (US); Los Gatos, Santa Clara Co., *Heller 7376* (C, F, G, M, NY, Ph, S, US); Santa Lucia Mts.,

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Plaskett 80 (G, NY, US); Santa Ynez Mts., Santa Barbara Co., *Brewer 314* (G, US); Zaca Lake, *Eastwood 707* (Ca, US); Painted Cave Ranch, *Eastwood 40* (US); Montecito, *Bingham* (NY); Southern California, *Parry & Lemmon 290* (F, G, NY), *Vasey in 1880* (US); Los Angeles Co., *Chamberlain* (NY); Sierra Santa Monica, *Hasse in 1890* (F, M, S, US), *4636* (NY); Santa Monica Cañon, *Barber 110* (C); Glendale to Burbank, *Braunton 911* (C, S, US); Los Angeles, *Davidson in 1890* (M), *Hasse in 1889* (M); Pasadena, *Allen in 1885* (G), *McClatchie in 1893* (NY); Verdugo Hills, *Abrams 1407* (S); Sierra Madre foothills, *Nevin 947* (G); San Dimas Cañon, *Munz & Harwood 3683* (C, Po, S); San Gabriel Cañon, *Munz 9431* (Po); San Juan Capistrano, *Nevin 679* (G); Sierra Cañon, Santa Ana Mts., *Munz & Harwood 3785* (Po); Sepulveda Cañon, *Abrams 333* (Po), *Munz & Harwood 3949* (Po); Avalon, *Trask in 1896* (M, US), *in 1897* (M), *Grant 2389* (NY), *in 1900* (S), *Nuttall 247* (F); Del Mar, San Diego Co., *Angier 144* (M), *120* (M); Red Cliff, *Angier 8* (C); San Diego, *Orcutt in 1889* (US), *in 1884* (NY); 25 mi. E. of San Diego, *Cleveland in 1878* (G); El Cajon Valley, *Orcutt in 1889* (US); Sweetwater, *Cleveland in 1878* (C); Tecate Mt., *Munz & Hilend 8018* (Po); La Costa, *Alderson 1200* (S); Cariso Creek, *Brandegec in 1893* (C); LOWER CALIFORNIA: N. Low. Calif., *Orcutt, in 1886* (F, NY, US); Vallecito, *Orcutt 1350* (G, M).

It does not seem necessary to take up for this species the name *hookerianum* proposed in 1923 by Pennell, since the *Antirrhinum strictum* of Sibth. & Smith (Fl. Graec. 6:75, pl. 594. 1826) is a *Linaria*. Moreover some of the more recent treatments, such as Halacsy (Conspectus Fl. Graecae 2:410 1902), do not even recognize it as a species under *Linaria*, but refer it to synonymy under var. *parnassica* Bois & Heldr. of *Linaria peloponnesiaca* Bois & Heldr.

EXCLUDED OR DOUBTFUL SPECIES

1. *A. uniflorum* Sesse & Mocino, Pl. Nov. Hispan, 95. 1893 & 102. 1887. From the description certainly not an *Antirrhinum*.

2. *A. maculatum* Sesse & Mocino, Pl. Nov. Hispan., 95. 1893 & 102, 1887. Apparently also not in this genus.

3. *A. kelloggii* Greene, Bull. Torrey Bot. Club 10:126. 1883.

I have been unable to get a photograph or other information concerning this species at the Greene Herbarium. At the Gray Herbarium and at the University of California there are specimens labeled "*A. Kelloggii* Greene. Part of type" in Mrs. Brandegee's handwriting. This collection was referred to *A. kingii* by Gray, Suppl. Syn. Fl., but is certainly *A. strictum*. Whether this is actually part of the type of *A. kelloggii* appears doubtful, although Greene's description fits it fairly well. Greene's type was from "Summit of the Sierra Nevada, Dr. H. Kellogg, July 20, 1876". But I have seen no other specimens of *strictum* from the Sierra Nevada.

IV. GALVESIA

Leaves regularly in 3's, glabrous or pubescent, coriaceous, 2-4.5 cm. long, those in inflorescence conspicuously reduced and pubescent; palate of lower lip glabrous; filaments very evidently dilated upward; flowers ca. 25 mm. long. (§Gambelia).....1. *G. speciosa*

Leaves not constantly in 3's, or, if so, scarcely over 2 cm. long, and those of inflorescence not markedly different from others; palate of lower lip pubescent; filaments not conspicuously dilated. (§Eugalvesia)

Corolla 22-30 mm. long; palate not both glandular and pubescent; North American species.

Leaves much reduced, almost lacking up to barely 1 cm. long, narrowly lance-elliptic; stems glaucous, broom-like; calyx and pistil glabrous2a. *G. juncea* var. *typica*

Leaves well developed, 1-2.5 cm. long, oval-elliptic to broadly ovate.

Stems glaucous; leaves glabrous; calyx and pistil glabrous.....2b *G. juncea* var. *foliosa*

Stems and leaves, calyx and pistil glandular-pubescent2c *G. juncea* var. *pubescens*

Corolla 12-22 mm. long; palate both glandular and pubescent; South American species.

Flowers 12-14 mm. long; pedicels 1-2 cm. long; style 7 mm.; filaments glandular in upper part; leaves obtusish.....3. *G. fruticosa*

Flowers 14-22 mm. long; pedicels 5-10 mm.; style 11-13 mm.; filaments glabrous in upper part; leaves often acuminate.....4. *G. ballii*

1. *GALVESIA SPECIOSA* (Nutt.) Gray, Proc. Amer. Acad. 22:311. 1887.

G. speciosa Gray, Brandg., Zoe 5:167. 1903. *Gambelia speciosa* Nutt., Jour. Philad. Acad. Nat. Sci. (II) 1:149. 1848. Pennell, in Millsp. & Nutt., Field Mus. Pub. Bot. 5:222. 1923. *Antirrhinum speciosum* Gray, Proc. Am. Acad. 7:376. 1868. Bot. Calif. 1:551. 1876. Syn. Fl. N. Am. 2:254. 1888. Meehan, Nat. Fls. Illus. II, 2:61, pl. 15. 1880. Greene, Bull. Calif. Acad. Sci. 1:227. 1885. Bailey, Cyclop. Hort. 1:305. 1914. Abrams, Fl. Los Ang., 329. 1917. Davidson & Moxley, Fl. So. Calif., 325. 1923. Jepson, Man. Calif., 897. 1925.

Smooth or pubescent, spreading, bright green shrub, 15-20 dm. high, stems fairly stout, generally glabrous except at nodes, where there is a line of hair on base of petioles and inflorescence; leaves verticillate in 3's, coriaceous, glabrous, or pubescent, slightly bicolored, ovate, entire, obtusish, mucronulate at apex, rounded at base, with 3 principal and some smaller veins converging toward apex, blades 2-4.5 cm. long, 0.5-2.0 cm. wide, petioles ca. 5 mm. long, flattened, channeled and pubescent above, uppermost leaves reduced to narrow, lanceolate, greenish bracts, pubescent, thin, acuminate, 5-10 mm. long; flowers in a terminal lax racemose or crowded, corymbose, glandular-pubescent inflorescence, pedicels slender, ascending, glandular-pubescent, 1-2 cm. long; calyx campanulate, herbaceous, glandular-pubescent within and without, somewhat oblique, 5-parted to near base, calyx-segments lanceolate, acuminate, subequal, 7-10 mm. long in flower, slightly enlarged and thickened in fruit; corolla scarlet, tubular, 22-26 mm. long, bilabiate, nearly or quite closed at throat, heavily glandular pubescent without, corolla-tube scarlet, subcylindric,

saccate at base anteriorly, 15-17 mm. long, 5-6 mm. wide, pubescent within just above insertion of 2 anterior stamens, upper lip of corolla somewhat reflexed, 6-7 mm. long, with oblong-ovate lobes separated ca. half way, lower lip spreading, 7-8 mm. long, with large glabrous palate extending to base of lobes, these oblong-ovate, ca. 3.5 mm. long, 3 mm. wide, middle one slightly narrower; fertile stamens 4, slightly didynamous, 17-19 mm. long, filaments conspicuously dilated and weakly glandular upward, geniculate and heavily pubescent above the expanded glabrate base, anther-sacs divergent, confluent, ca. 1 mm. long; 5th stamen with rudiment of anther, inconspicuous; pistil scarcely equal to stamens, style and ovary glandular-pubescent, ovary oblique, stigma not divided, flattened; capsule subglobose, slightly oblique, thick-walled, with persistent filiform style, dehiscing by 2 irregular terminal pores; seeds oblong, dark, ca. 1 mm. long, not winged, with thin irregular broken ridges.

Type locality: Catalina Island. Material studied: CALIFORNIA: Catalina *Gambel*, type collection, (G, NY), *Trask in 1900* (NY), *in 1896* (C, M, US), *in 1897* (US), *Mills-paugh 4832* (F), *Knopf 392* (F), *Hall 8289* (C); San Clemente Island, *Nevin & Lyon 6* (G, S), *Trask in 1902* (US), *Purpus* (C), *Brandegee in 1894* (C), *Evermann in 1918* (Ca), *Peirson 3476* (S), *Munz 6685* (Po). MEXICO: Guadalupe Island, *Palmer 57* (F, G, M, NY, Ph), *Brandegee in 1897* (C).

2. *GALVESIA JUNCEA* (Benth.) Gray, Proc. Amer. Acad. 22:311. 1887.

Erect or spreading shrubs with many slender stems, much branched and 6-15 (20) dm. high, nodes 2-8 (10) cm. long; leaves opposite or verticillate in 3's, variable as to size and pubescence, veins converging toward tip; flowers borne in 2's or 3's near upper parts of stem, pedicels 1-3 cm. long; calyx herbaceous, campanulate, 5-parted, calyx-segments lance-ovate to oblong-ovate, subequal, 2.5-5. mm. long in flower, 5-7 mm. in fruit; corolla tubular, scarlet, 2.5-3. cm. long, glandular-pubescent without, tube saccate at base, on

anterior side, 15-25 mm. long, 3-5 mm. wide, apparently scarlet without, cylindrical, scarcely ampliate into a throat, tawny-pubescent within from near base to well formed pubescent palate, lower lip reflexed, 4-8 mm. long, the 3 lobes rounded, 1.5-2 mm. long, palate extending to their very base but not closing throat, upper lip suberect, ca. equal to lower, obscurely 2-lobed at very tip; 4 fertile stamens very slightly dilated upward, extremely variable in length (from subequal and two-thirds length of corolla, to markedly didynamous with 2 anterior equaling the corolla, to subequal and the longer slightly exceeding corolla), commonly with anthers exserted, variable also as to pubescence, but all coarsely pubescent at the slight genicula, and dilate and glabrous at base, anthers confluent and divergent; 5th stamen without vestige of anther; stigma entire, slightly flattened, style varying in length with stamens, pubescence variable, ovary oblique at base; capsule 2-celled, ovoid, firm-walled, 8-9 mm. long, 6-7 mm. thick, with persistent filiform style inserted between the 2 slightly projecting valves, each of these dehiscent by a terminal rounded, irregular opening; seeds dark, ca. 1 mm. long, oblong, wingless with numerous thin, broken and irregular ridges.

2a. *Galvesia juncea* var. *typica*, nom. nov.

Maurandia juncea Benth., Bot. Sulph., 41. 1844. D. C., Prodr. 10:296. 1846. *Saccularia veatchii* Kell., Proc. Calif. Acad. Sci. 2:17. 1860. Curran, Bull. Calif. Acad. 1:144. pl., 1885. Gray, Bot. Calif. 1:551. 1876. *Antirrhinum junceum* Gray, Proc. Am. Acad. 7:377. 1868. Syn. Fl. N. Am. 2:254, 439. 1888. Bot. Calif. 1:551. 1876. 2:472. 1880. Brandegee, Proc. Calif. Acad. II, 2:190. 1889. Davidson & Moxley, Fl. S. Calif., 325. 1923. *Galvesia juncea* Gray, Proc. Am. Acad. 22:311. 1887. Vasey & Rose, Proc. U. S. Nat. Mus. 2:533. 1889. Contr. U. S. Nat. Herb. 1:19. 1890. Ball, Jour. Linn. Soc. 22:152. 1887. Goldman, Contr. U. S. Nat. Herb. 16:364. 1916. Johnston, Proc. Calif. Acad. IV, 12:1160. 1924.

Leaves reduced or almost lacking, scarcely 1 cm. long, narrowly lance-elliptic; stems glaucous, broomlike; calyx and pistil glabrous.

Type locality: "West coast of Lower California, probably at San Quentin." *Material studied*: LOWER CALIFORNIA: San Antonio Cañon, *Hill & Ballou in 1925* (Po); Calmalli, *Purpus 198* (C); Salada Cañon, *Brandegee in 1893* (C); San Quentin, *Nelson & Goldman 7109* (US), *Palmer 720* (G, NY, Ph); San Julio Cañon, *Brandegee in 1889* (C, Ph); Playa Maria, *Anthony 85a* (G, M, NY, Ph, S, US); San Telmo, *Orcutt 1363* (G, M, NY, Ph, US); Cedros Island, *Belding in 1881* (G), *Veatch*, type collection of *Saccularia Veatchii* (G, NY), *Streets in 1876* (G, US), *Anthony 286* (C, G, M, S, US), *85* (C, G, M, NY, Ph, S, US), *Palmer 720* (G, NY, US), *Rose 16093* (NY, US), *Pond in 1889* (US), *Greene in 1885* (F), *Stewart in 1906* ? (Ca).

Variable and intergrading with var. *foliosa*, e. g., *Palmer 720*.

2b. *GALVESIA JUNCEA* var. *FOLIOSA* Johnston, Proc. Calif. Acad. Sci. IV, 12:1161. 1924.

G. glabrata Brandg., *Zoe 5:167*. 1903.

Stems glaucous; leaves 1-2.5 cm. long, glabrous; calyx and pistil glabrous.

Type locality: San Felipe, Lower California. *Material studied*: LOWER CALIFORNIA: San Felipe, *Purpus 463*, type of *glabrata* (C, M, US); Saucito, *Brandegee in 1893* (C); Las Animas Bay, *Johnston 3510* (Ca); Santa Maria Bay, *Rose 16257* (NY, US); Cape San Lucas, *Rose 16370*, in part (NY, US); South San Lorenzo Island, *Johnston 3530* (Ca, G); San Pedro Nolasco Island, *Johnston 3133* (Ca, G).

2c. *GALVESIA JUNCEA* var. *PUBESCENS* (Brandg.) Johnston, Proc. Calif. Acad. Sci. IV, 12:1161. 1924.

G. juncea of Brandg., Proc. Calif. Acad. Sci. II, 3:225. 1892. *G. speciosa* var. *pubescens* Brandg., *Zoe 5:167*. 1903. *G. rupicola* Brandg., Univ. Calif. Pub. Bot. 6:360. 1916.

Leaves well developed, 1-2.5 cm. long, oval-elliptic, glandular-pubescent, as are stems, calyx, and pistil.

Type locality: "On the rocks of Cape San Lucas, Lower California." *Material studied*: LOWER CALIFORNIA: Cape San Lucas, *Brandegee in 1892*, type of *rupicola* (C, G), *Rose 16370*, in part (NY, US); Saucito, *Brandegee in 1893* (C); Angel de la Guardia Island, *Johnston 3420* (Ca); Espiritu Santo Island, *Johnston 3980* (Ca, G).

Intergrading with var. *foliosa*, *Rose 16370* having both sorts on one branch.

3. GALVESIA FRUTICOSA Gmelin, Syst., 937. 1791.

G. fruticosa, Juss. ex Steudel, *Nomen. bot.* 1:356. 1821. Stewart, *Proc. Calif. Acad. Sci.* IV, 1:141. 1911. *Russelia* ? *alternifolia* Pers., *Syn.* 2:164. 1807. *Agassizia limensis* Dombey ex Chavannes, *Monogr. Antirr.*, 180. pl. 11. 1833. *Galvesia limensis* Domb., Benth. in D. C., *Prodr.* 10:296. 1846. Weberbauer in Engler & Drude, *Veg. der Erde*, 12: 107, 153. 1911.

Spreading shrub, 3-10 dm. high, ultimate branches slender, glandular-puberulent; leaves opposite (especially lower ones) or alternate, somewhat fleshy glabrate or glandular-puberulent, ovate-lanceolate, with blades 5-25 mm. long, 4-15 wide, obtusish, mucronulate, petioles somewhat grooved above, glandular-puberulent, 3-7 mm. long; flowers near ends of branches, borne singly in axils of somewhat reduced and crowded upper leaves, pedicels slender, glandular-pubescent, spreading, somewhat recurved, somewhat tortuous after anthesis, 8-20 mm. long; calyx herbaceous, glandular-puberulent within and without, 5-parted, the segments subequal, lance-ovate, 2-3 mm. long, slightly enlarged in fruit; corolla "scarlet", tubular, glandular-pubescent without, 12-14 mm. long, tube slightly saccate at base, then slightly constricted, then slightly ampliate into narrow throat, within having stalked glands and sparse coarse pubescence anteriorly, 7-8 mm. long and 2-3 broad, limb bilabiate, upper lip reflexed, glandular-puberulent within, 4-5 mm. long, its 2 lobes rounded-ovate, grown together ca. half way, lower lip glandular-puberulent especially on palate, 4-5 mm. long, the 3 lobes ovate, grown together ca. half way;

4 stamens 8-9 mm. long, slightly didynamous, filaments not dilated, conspicuously glandular, with coarse short pubescence at genicula, glabrous at base, anther-sacs divergent, confluent, each pair forming almost a circle after dehiscence; 5th stamen inconspicuous, with anther not evident; pistil scarcely as long as stamens, ovary and style glabrous, or weakly glandular-puberulent, style 5-6 mm. long, persistent, flattened upward, stigma slightly 2-lobed; capsule depressed-globose, 2-celled, 4-5 mm. long, thin-walled, dehiscing by 2 irregular pores; seeds scarcely 1 mm. long, oblong, not winged, with several irregular broken ridges.

Material seen: PERU: Galapagos Islands, *Stewart 3440* (Ca, G), *3441* (Ca), *3442* (Ca); Lima, *Wilkes Explor. Exped.* (G, NY, US); Tambo de Pariocota, *Macbride & Featherstone 2540* (US).

4. *Galvesia ballii*, nom. nov.

G. limensis Domb. var. *grandiflora* Benth., in D. C. Prodr. 10:296. 1846. Ball, Jour. Linn. Soc. 22:151. 1887.

Apparently spreading shrub much like *G. fruticosa*; leaf-blades acuminate to acute, 5-25 mm. long, 5-15 mm. wide, petioles flattened, puberulent, 2-5 mm. long; pedicels glandular-puberulent, 5-10 mm. long, deflexed after anthesis; calyx-segments 3-4 mm. long; corolla tubular, glandular-puberulent without, 16-22 mm. long, upper lip 6-7 mm. long, lower lip same length; fertile stamens 12-14 mm. long, not conspicuously dilated, glabrous except at genicula; pistil 12-14 mm.

Type locality: Payta, Peru. Material seen, Payta, *Andre 4119* (NY), *Ball in 1882* (G, NY); *Rusby 2504* (NY). Ball, l. c., reports it also from Manta, Ecuador.

To be sure the amount of material available was not great and it may be that this plant is not specifically distinct from *G. fruticosa*. But such characters as pubescence of stamens, flower size, etc. seem quite fundamental. *Rusby 2504* has leaves varying from acuminate to obtusish. The name *Ballii* is proposed because of the uncertain *Galvesia grandiflora* (Kell.) Benth. of Wettstein in Engler & Prantl, Pflanzenfam. IV. Abt. 3b, p. 61. 1895, supposed to be from California. I

have been unable to find any justification whatsoever for this name, nor any indication as to what it may refer, but it seems best not to continue the use of the name *grandiflora* after this confusion.

V. EPIXIPHIMUM (Engelm.), gen. nov.

Recognized as a section by Gray (Proc. Am. Acad. 7:377. 1868) of the genus *Maurandia*, and sufficiently characterized there. Having but one species which is undoubtedly closely related to *Maurandia antirrhiniiflora* but differing so widely in its capsule characters, heavily indurated sepals, and flat seeds, as apparently to deserve generic recognition.

1. *Epixiphium wislizeni* (Engelm.), n. comb.

Maurandia wislizeni Engelm. by Gray, in Torrey, Bot. Mex. Bound. Surv., 111. 1859. Gray, Proc. Am. Acad. 7:377. 1868. Syn. Fl. N. Am. 2:254. 1888. Coulter, Contr. U. S. Nat. Herb. 2:307. 1892. Hemsley, Biol. Centr. Amer. 2:442. 1882. Small, Fl. S. E. U. S., 1057. 1903. Wootton & Standley, Contr. U. S. Nat. Herb. 19:578. 1915. Johnston, Proc. Calif. Acad. Sci. IV, 12:1163. 1924.

Glabrous herb climbing by tortile petioles and pedicels; leaves thin, alternate, triangular-hastate, some obscurely 5-lobed, each lobe mucronulate, margin otherwise entire, scarcely if at all bicolored, base cordate, apex acuminate (obtuse in lowest leaves), with 3 principal veins in terminal portion, blades 1-4 cm. long, 1-3 (4) wide, petioles glabrous, fairly stout, 1-5 cm. long; flowers solitary, axillary, horizontal, pedicels slender at anthesis, less than 1 cm. long, thickened in fruit; calyx herbaceous at anthesis, slightly oblique, 5-parted almost to base, calyx-segments linear-lanceolate, subequal, 12-15 mm. long, tips somewhat spreading, calyx-segments in fruit triangular-lanceolate, indurate, especially at base, strongly reticulate, 2.5-3.5 cm. long and 1 cm. wide at base, strongly keeled at base, upper halves spreading, acuminate; corolla 3-3.5 cm. long, "pale blue", glabrous without, 2-lipped, funnelform, tube 5-6 mm. long, slightly gibbous anteriorly, glabrous within at

base, pubescent upward, throat rapidly expanding to ca. 1 cm. across, without plaits or hair within, corolla-limb suberect, ca. 1 cm. long, the 2 upper lobes well grown together, suborbicular, lower lip pubescent at base, its 3 lobes ca. 5 mm. long, the middle one narrowest; stamens didynamous, ca. 15 & 17 mm. long, anther-sacs confluent, filaments glandular above and below (just above slight genicula), heavily pubescent below genicula to glabrate expanded base; style in flower glabrous, ca. 15 mm. long, flattened below, stigma bilobed, ovary glabrous; capsule 12-15 mm. long, globose-ovate, coriaceous, surmounted by persistent beak-like, flattened style, which is ca. 4 mm. wide at base, pointed above and 12-15 mm. long, dehiscence by clean curving transverse slit on each side of base of beak; seeds tawny, with body 2-2.5 mm. long, compressed, oval, "chaffy-rugose", surrounded by an entire emarginate wing, ca. 1 mm. wide.

Type locality: "Along the Rio Grande below Dona Ana". Material studied very extensive, only a small part is here cited of all that has been seen, NEW MEXICO: Valverde, so. of Santa Fe, *Wislizenus* 45 (M); Ft. Craig, *Rusby* 314 (M, US), 320 (F); Las Cruces, *Wootton* in 1893 (US), *Vasey* in 1881 (F, US) Puebla Crossing, *Wootton* in 1900 (US); mesa W. of Organ Mts., Dona Ana Co., *Wootton* in 1893 (US); San Marcial, *Herrick* 846 (US); plains of Acoma, *Saunders* in 1903 (Ph); Upper Gila, *Grcenc* in 1880 (F, M, Ph, Po, NY); Messila, *Standley* 451 (US), *Dewey* in 1891 (US), *Wootton* in 1899 (Po), 25 (C, G, M, NY, Po, S, US), in 1902 (US), in 1904 (US); Deming, *Mulford* 1123 (M, NY), *Griffith* 3328 (US); valley of Rio Grande, *Mex. Bound. Surv.*, type (G, NY, US); without locality, *Wright* in 1851 (G, NY). TEXAS: Ft. Hancock, *Mearns* 1520 (US); western Texas, *Wright* (G, NY, Ph, US). MEXICO: Laguna de Guzman, Chihuahua, *Hartman* 718 (G, US); Chihuahua, *Thurber* 762 (G, NY), in 1852 (F); Paso del Norte, *Pringle* in 1885 (G); Colonia Diaz, *Nelson* 6450 (G, US); Samalayuca, *Coville* 1698 (US); Sapio, Sierra Madre Mts., *Jones* in 1903 (Po); Bolson de Mapimi, Rio Nazas, *Gregg* in 1847 (NY).

VI. MAURANDYA

Anther-sacs oblong after dehiscence, confluent or in contact; calyx-segments lanceolate, almost distinct; leaves deltoid, glabrous; seeds not winged; climbing plants; leaf-margin quite entire except for main lobes.

Plaits within corolla developed distally into a palate, corolla not over 3 cm. long, blue, ridges light yellow; plant herbaceous.....

.....§ *Antirrhinoidea*. 1. *M. antirrhiniflora*

Plaits not developed into a palate but distinct, corolla generally over 3 cm. long; plants somewhat woody.§ *Usteria*

Sepals glabrous; corolla lavender.....2. *M. scandens*

Sepals conspicuously glandular-pilose; corolla deep purple3. *M. barclaiana*

Anther-sacs circular after dehiscence, discrete; calyx-lobes ovate (ovate-lanceolate in *glabrata*); leaves circular or cordate or reniform; habit various; leaf-margin dentate or crenate or serrate.....§ *Lophospermum*

Flowers yellow; stamens well exerted; pedicels tortuous; seeds apterous.....4. *M. flaviflora*

Flowers not yellow; stamens included or barely visible; pedicels straight or geniculate, at least not tortuous.

Stems not climbing; corolla with 2 prominent plaits on the floor of the throat, which are thickly beset with hairs.

Seeds apterous.

Fruiting pedicels thickened, geniculate; leaf-margins crenate; calyx cleft to near middle, 12 mm. long, the segments oblong-ovate, obtuse.....5. *M. geniculata*

Fruiting pedicels not thickened nor geniculate; leaf-margins dentate; calyx cleft two-thirds its length, 15-20 mm. long, the segments lance-ovate, acute.....6. *M. rosei*

Seeds winged; fruiting pedicels spreading or ascending.

Plant strongly pubescent; calyx-segments ovate; anterior pair of fertile stamens distinctly longer than posterior pair; sterile stamen scarcely reaching the genicula of posterior fertile ones.....9. *M. erecta*

Plant glabrate; sepals more or less cordate; fertile stamens subequal; sterile stamen almost half as long as fertile ones.....7. *M. purpusii*

Stems climbing; corolla without prominent plaits on the floor of the throat, but merely with 2 prominent lines of hairs; seeds winged.

Plant densely softly pubescent, grayish; sepals oblong-ovate; flowers rosy pink8a. *M. erubescens* var. *typica*

Plant glabrate or somewhat pubescent, green; sepals lance-ovate; flowers rose-purple8b. *M. erubescens* var. *glabrata*

1. MAURANDYA ANTIRRHINIFLORA Humb. & Bonpl. ex Willd., Hort. Berol., pl. 83. 1807 & Enum. Hort. Berol., 659. 1809.

M. antirrhiniflora of Curtis Bot. Mag. 40: pl. 1643. 1814. Benth., in D. C., Prodr. 10:296. 1846. Chavannes, Mon. Antirrh., 78. pl. 2, f. B. 1833. Nees & Schauer, Linnea 20: 712. 1847. Martens & Galeotti, Acad. Roy. Brux. 12: no. 7, p. 3. 1845. Gray, Bot. Ives Exped., 19. 1860. Gray, in Torrey, Bot. Mex. Bound. Surv., 110. 1859. Torrey, Bot. Sitgreaves Exped., 166. 1853. Armstrong, W. Wildfl., 466. 1915. Britton, Fl. Bermuda, 346. 1918. Pennell, Proc. Acad. Nat. Sci. Phila. 73:500. 1922. *M. antirrhina* Lindl., Torrey in Emory Recon., 146. 1848. Probably *M. sempervirens* Jacq. of Small, Bot. of the Bermudas, 44. 1913. *M. personata* Lag., Gen. et Sp. Nov., 19. 1816. *Usteria antirrhiniflora* Poir., Encyc. Suppl. 5:405. 1817. *Antirrhinum antirrhiniflorum* of Small, Fl. S. E. U. S., 1056. 1903. *A. antirrhiniflorum* of Hitchcock, Rep. Mo. Bot. Gard. 4:113. 1893. Schulz, Wildflowers of San Antonio, 191. 1922. Wootton & Standley, Contr. U. S. Nat. Herb. 19:578. 1915. *A. maurandioides* Gray, Proc. Am. Acad. 7:376. 1868. Syn. Fl. N. Am. 2:254. 1888. Bot. Calif. 1:551. 1876. Porter, in Bot. Wheeler Surv., 209. 1878. Hemsley, Biol. Centr. Amer. 2:441. 1882. Coulter, Contr. U. S. Nat. Herb. 2:306. 1892. Jepson, Man. Calif., 898. 1925. Bailey, Cyclop. Hort. 1:305. 1914.

Perennial herb, climbing by the tortuous petioles and pedicels, stems slender, glabrous, green; leaves thin, alternate, not strongly bicolored, glabrous, triangular, hastate to 5-lobed, each lobe mucronulate, margin otherwise entire, base cordate, 3 main veins in terminal portion of blade, tip acuminate, 5-25 mm. long, equally wide, petioles glabrous, slender, 5-25 mm. long, green; flowers solitary, axillary, horizontal, pedicels filiform, glabrous, 1-2 cm. long; calyx 5-parted almost to base, narrowly campanulate, glabrous, calyx-segments green, lance-linear, the tips spreading, the 3 upper segments straight or curving upward, 10-12 mm. long at anthesis, the 2 lower curving, 11-13 mm. long, calyx-segments bulging in fruit, but tips connivent, 12-15 mm. long, scarcely thickened; corolla 2.5-3.0 cm. long, glabrous without, tube whitish, 4-5 mm. long, ca. 3 mm. wide, mostly glabrous within, pubescent where it expands into the throat, throat whitish, tinged blue without, ca. 1 cm. wide, pubescent within and with 2 prominent plaits fusing anteriorly to form conspicuous yellow palate at base of lower lip, base of upper lip also somewhat plaited, throat not closed, limb blue to reddish, upper lobes 5-6 mm. long, blunt, lower lobes ca. 6 mm. long; stamens included, didynamous, ca. 17-19 mm. long, anther-sacs confluent, ca. 1.5 mm. long, filaments clavate, glandular above, slightly geniculate and heavily pubescent above the glabrous dilated base; 5th stamen very rudimentary; style glabrous, persistent, flattened toward tip, 12-13 mm. long, ovary glabrous, ovoid-globose; capsule globose, rather thin, glabrous, 7-8 mm. long, included in calyx, with irregular subterminal dehiscence; seeds oblong, ca. 1 mm. long, wingless, brown, with corky short broken, tuberculate ridges.

Type locality: Mexico. Some hundreds of herbarium sheets have been studied for this species and it hardly seems worth while citing so many. I have therefore selected representative ones and such as will give some indication of range. The species seems to be largely an inhabitant of lime soils. CALIFORNIA: Providence Mts., Mohave Desert, *Brandege* in 1902 (C, US), *Munz, Johnston & Harwood* 4282 (Po);

Kelso, *Jones in 1906* (Po). ARIZONA: Union Pass. N. Ariz., *Wilson 28* (C, US); Grand Cañon, *Hitchcock in 1915* (US), *Gray in 1885* (G); Chiricahua Mine, *Blumer 1805* (F, G, M, NY, US); Tucson, *Toumey in 1894* (C, NY, US), *Pringle in 1884* (F, NY, Ph, US); Bisbee, *Gooding 708* (G, NY). NEW MEXICO: Silver City, *Metcalf in 1898* (US); Albuquerque, *Rusby in 1909* (NY); Lincoln, *F. S. & E. S. Earle 548* (M, NY, US). TEXAS: El Paso, *Stearns 167* (US), *Jones 4346* (F); Austin, *Hall 507* (F, M, NY, US); Laredo, *Letterman 351* (M, NY); San Marcos, *Pennell 10428* (NY, Ph); San Antonio, *Jermy 234* (G, M, NY). MEXICO: Sonora, *Hartman 858* (G); Parral, Chihuahua, *Goldman 115* (G, US); Ciudad, Chihuahua, *Stearns in 1911* (NY, Ph); La Ventura, Coahuila, *Nelson 3915* (US); Torreon, Coahuila, *Palmer 475* (C, F, G, M, NY, US); Tula, Hidalgo, *Pringle 6365* (C, F, G, M, NY, Ph, US); Tehuacan, Puebla, *Liebmann 9415* (NY, US); Sota la Marina, Tamaulipas, *Nelson 6642* (G); Vallee de Mexico, Guadalupe, *Bourgeau in 1865-66* (G, US); Tequisquiapam, Querétara, *Nelson 3872* (G, US); San Luis Potosi, *Parry & Palmer 665* (F, G, M, Ph, US); Zacatecas, Jalisco, *Coulter* (NY). Naturalized in many places east of its original range: Miami, Fla., *Tracy 9428* (G, M, NY); Grantstown, New Providence, Bahamas, *Wilson 8216* (F, NY); Bermuda, *Collins 284* (G, NY, US); Malvern, Santa Cruz Mts., Jamaica, *Britton 1302* (NY); *Harris 9660* (G, F, NY, Ph, US).

2. MAURANDYA SCANDENS (Cav.) Pers., Synopsis 2:160. 1807.

M. scandens of Bailey, Cyclop. Hort. 4:2012. 1916. Britton, Fl. Bermuda, 346. 1918. Johnston, Proc. Calif. Acad. Sci. IV, 12:1163. 1924. *Usteria scandens* Cav., Ic. Pl. 2: pl. 116. 1793. Andrews, Botanists Repository 1: t. 63. 1794. *Reichardia scandens* Roth, Catal. 2:64. 1800. *Maurandya semperflorens* Ortega, Nov. Gen. Hort. Matr. decas. 2:21. 1797. Jacquin, Hortus Schönbn., 3:20, t. 288. 1798. Curtis, Bot. Mag. 13: t. 460. 1799. Willd., Enum. Pl. Hort. Berol..

659. 1801. Sp. Pl. 3:389. 1801. Spreng., Syst. Veget. 2:814. 1825. Chavannes, Monogr. Antirrh., 78. 1833. Benth. in D. C., Prodr. 10:297. 1846. Nees & Schauer, Linnea 20:712. 1847. Gray, Proc. Am. Acad. 7:377. 1868. Hemsley, Gard. Chron. N. S., 17:22. 1882. Biol. Centr., Am. 2:442. 1882. Read, Pls. Bermudas, 67. 1883. Smith, Enum. Pl. Guat. 2:55. 1890. Urbina, Cat. Pls. Mex., 256. 1897.

Suffrutescent climber, petioles and pedicels twining, stems slender, glabrous, younger ones often reddish; leaves thin, alternate, bright green above, paler below, glabrous, triangular-cordate, sometimes obscurely 5-lobed, each lobe mucronulate, margin otherwise quite entire, somewhat hastate at base, acuminate, 3 main veins running into terminal portion, 1-5 cm. long, 1-4 wide, petioles glabrous, slender, green or reddish, 1-2 cm. long; flowers solitary, axillary, horizontal, pedicels slender, glabrous, 5-10 cm. long; calyx 5-parted, narrowly campanulate, glabrous, the segments green, lance-linear, the 3 upper straight, 13-15 mm. long, 2 lower slightly curved upward, 12-14 mm. long, in fruit the segments becoming 18-20 mm. long, tips connivent, base somewhat thickened; corolla 3.5-4.5 cm. long, finely glandular-puberulent without, broadly funnel-form, bilabiate, tube whitish, swollen at base in front, 5-8 mm. long, 6-7 mm. wide, pubescent within above the base, throat whitish, with lavender tinge, amplified, 12-15 mm. wide at its extreme, glabrous with 2 prominent plaits on floor, limb lavender, reflexed, lobes suborbicular, ca. 1 cm. long, the 2 upper slightly largest, middle lower smallest; stamens didynamous, ca. 18 & 20 mm. long, enlarged and provided with yellow glands above, glandular also just above genicula, where also heavily pubescent, flattened and glabrous at base, anthers oblong, confluent; 5th stamen very reduced; style filiform, almost equal to shorter stamens, glabrous except for few scattered glandular hairs at base, persistent, ovary very sparingly glandular-pubescent at base of style; capsule globose, glabrous, ca. 1.5 cm. long, rather firm walled, dehiscing by 2 rather irregular subterminal openings; seeds oblong, 1-1.5 mm. long, brown, with few irregular broken, corky, tuberculate ridges, not winged.

Type locality: Mexico. Material studied, MEXICO: valley of Rio Nazas, *Gregg* 445 (M); Molino, Morelia, *Arsène in* 1910 (F); Puebla, Molino, *Nicolas* 78 (Ph); Orizaba, Vera Cruz, *Botteri* 540 (G, US); Rio de San Francisco, Puebla, *Purpus* 4102 (C); San Simon, *Purpus* 3965 (C); Barranguito de Puebla Viejo Nochixtlan, Oaxaca, *Conzatti* 1850 (F, G); Dominguillo, *Nelson* 1594 (G); Cuilapam, *Smith* 46 (G); Oaxaca, *Scler* 1582 (G); Monte Alban, *Smith* 396 (US), *Pringle* 4786 (C, G, M, NY, Ph, US); Cerro San Antonio, *Conzatti* 1409 (G), 1964 (F); Cerro San Felipe, *Conzatti* 2244 (F, G); De Huranchilla a Nothixllax, *Conzatti* 4276 (US); Valley of Oaxaca, *Nelson* 1251 (US); Huajuapán, *Nelson* 1969 (US); near Mexico, Bustamente y Rocha, no coll., (NY). GUATEMALA: Antigua, Zacatepequez, *Smith* 2181 (G), *Kellerman* 4702 (US). BERMUDA (where introduced): Pembroke, *Collins* 283 (G, NY, US); Mt. Langton, *Harshberger in* 1905 (G, NY, Ph, US), *Brown & Britton* 412 (NY, Ph); Harrington House, *Brown, Britton & Seaver* 1129 (NY, Ph, US); without locality, *Flynn* 87 (M). Botanical Garden specimens: Hort. Duval, Cartigny, in 1826 (NY); Hort. Saltzwedel, Frankfurt, *Engelmann in* 1825 (M);

3. MAURANDYA BARCLAIANA Lindl., Bot. Reg. 13: t. 1108. 1827.

M. barclaiana in Lodd, Bot. Cab. 14:t. 1381. 1828? Bailey, Cyclop. Hort. 4:2012. 1916. *M. barclayana* in Martens & Galeotti, Bull. Acad. Roy. Brux. 12: No. 7, p. 3. 1845. Chavannes, Monogr. Antirrh., 77. 1833. Benth., in D. C., Prodr. 10:297. 1846. Gray, Proc. Am. Acad. 7:377. 1868. Hemsley, Gard. Chron., N. S., 17:22. 1882. Biol. Centr. Am. 2:441. 1882. Urbina, Cat. Pls. Mex., 256. 1897. Ramirez & Alcocer, Sin. Pls. Mex., 106. 1902. Britton, Fl. Bermuda, 347. 1918. Johnston, Proc. Calif. Acad. Sci. IV, 12:1163. 1924.

Suffrutescent climber of the same habit, leaves, etc. as the preceding species; leaf-blades 1-3.5 cm. long & 1-3 broad, petioles 1-2.5 cm. long; pedicels slender, glabrous, 3-5 cm. long; calyx 5-parted almost to base, conspicuously glandular-villous

on the outside with slender, several-celled hairs, glabrate within, calyx-segments linear-lanceolate, the 3 upper ones subequal, straight, 10-13 mm. long in flower, the 2 lower ones curving upward, 9-12 mm. long, in fruit sometimes up to 2 cm. long; corolla 3-4.5 cm. long, glandular-puberulent without, tube greenish white with bluish tinge, swollen at base in front, 5-7 mm. long, 5-6 wide, glabrous within at base, hairy above, throat of same color, sometimes tinged with yellow, 10-13 mm. wide, glabrous within, with 2 prominent pale plaits, limb dark purple, reflexed, lobes 7-8 mm. long, suborbicular; stamens much as in *scandens*, but more heavily villous below the genicula; pistil as in *scandens*; capsule globose, ca. 1 cm. long, the 2 valves projecting slightly beyond insertion of persistent style, dehiscence terminal, rather irregular; seeds oblong, etc. as in *scandens*.

Type locality: Mexico. Material studied, MEXICO: near Mondora, Coahuila, *Palmer* 972 (G); San Luis Potosi, *Schaffner* 748 (G, NY, Ph), *Parry & Palmer* 664 (M, Ph); Mimas de San Rafael, San Luis Potosi, *Purpus* 4911 (C, G, NY); Alvarez, San Luis Potosi, *Palmer* 606 (C, F, G, M, NY, US); Sierra de la Mesa, Hidalgo, *Rose, Painter & Rose* 9105 (US); San Luis Tultitlanapa, near Oaxaca, *Purpus* 2575 (C, F, G, M, NY, S, US); San Felipe del Agua, Oaxaca, *Conzatti* 588 (G); between Cadereyta & Visaron, Querétaro, *Rose, Painter & Rose* 9747 (NY, US); Guanajuato, *Duges in 1880* (G); without locality, *Coulter* 1342 (G). Introduced into other countries and escaped: Ambato, Tungurahua, Ecuador, *Pachano* 87 (NY); Barbacena, Brazil, *Dorsett, Shamel, & Popenoe* 307b (US). The following cultivated material was available: Hort. Cantab., 1845 (G, NY), 1856 (G); Hort. Aupet a la Garaz prope Nevey, 1832 (NY); Hort. Haren., St. Louis, *Engelmann in 1850* (M); Philadelphia, *Redfield* 5969 (M).

Lindley's description gives the length of the corolla as 3 in. and is followed by Bailey, l. c. I have seen no material with flowers more than half this length. The species is very close to *M. scandens* and may be sufficiently distinct from that species for varietal rank only.

4. MAURANDYA FLAVIFLORA Johnston, Proc. Calif. Acad. Sci. IV, 12:1162. 1924.

"Perennial (?) forming loose mat-like growths 2-5 dm. broad and about 1 dm. high; clammy-oily villous throughout, stems slender, branched mainly near the base; leaves bright green, thin, numerous, alternate, very broadly cordate or reniform, coarsely serrate, 20-25 mm. long, 25-40 mm. wide; petioles slender, non-tortuous, 1-3 cm. long; flowers axillary; pedicels slender, 20-25 mm. long, in fruit becoming coarse contorted and 5-10 cm. long; calyx 5-parted, in flower 11-12 mm. long with lobes foliaceous and the upper the longest (9 mm. long), accrescent in fruit, becoming firmer with lobes ovate and tube more developed; corolla pale yellow, cylindrical, glabrate outside, 25-28 mm. long; corolla-tube 4-5 mm. long, 4 mm. broad, glabrous within, stamens attached at about the middle and adnate to beginning of throat; corolla-throat amplified, 7-8 mm. wide at the middle, about 15 mm. long, within the lower part pubescent with numerous short flat yellow hairs (as is also the lower part of the filaments); corolla lobes broadly ovate or orbicular, not spreading, upper pair longest and united for about a third their length, lower lobes 3-4 mm. long with middle one the shortest; stamens 4, protruding 2-6 mm., fifth represented by small appendage near middle of corolla tube and between shorter pair of filaments; filaments flat, heavy pubescent below, with tack-shaped glands above, upper pair shortest being only about 25 mm. long, lower pair about 28 mm. long; anther-sacs about 1.25 mm. long, circular, discrete, divergent" after dehiscence; "pistil filiform, equalling or longer than stamens; fruit a turgid, laterally compressed, many-seeded capsule about 1 cm. broad; valves short-acuminate, above forming 2 crest-like apices in whose sinus is borne the sub-persistent style; seeds" almost black "with high irregular coarse corky longitudinal ridges, oblong, almost 2 mm. long", not winged.

Type and only known collection: Las Animas Bay, Lower California, Johnston 3504 (Ca, G).

5. *MAURANDYA GENICULATA* Rob. & Fern., Proc. Am. Acad. 30:120. 1894.

M. geniculata of Johnston, Proc. Calif. Acad. Sci. IV, 12: 1163. 1924.

Apparently perennial herb, densely glandular-villous and viscous throughout, stems zigzag; leaves orbicular-cordate, thick, coarsely crenate, with blades 2-5 cm. broad, 2-4 cm. long, apparently not strongly bicolored, 5-nerved, petioles spreading, 1-2 cm. long; flowers not known; pedicels in fruit stout, recurved, up to 2 cm. long, solitary, axillary, calyx narrowly campanulate, subequally 5-cleft to near the middle, ca. 12 mm. long, segments oblong-ovate, obtuse, spreading at tips; style filiform, persistent, ca. 2 cm. long, slightly glandular; capsule glabrate, globular, ca. equal to calyx, irregular in dehiscence; seeds black, oblong, 1.5 mm. long, with large irregular, corky tubercles, not at all winged.

Known from a single collection on "cliffs at Nacroy, Sonora," at 3750 ft. by *Mr. Hartman No. 272*, (G, NY, US).

6. *Maurandya rosei* Munz, new species

Apparently low perennial herb, densely glandular-villous and oily throughout, stems at least 2-3 dm. high, often zigzag in fruit; leaf-blades orbicular-cordate, coarsely dentate, 2-4 cm. long, 2-4 wide, not bicolored, indistinctly 5-nerved, petioles ascending to recurved-spreading, 1-2 cm. long; flowers axillary, pedicels slender, 1-2 cm. long, contorted but scarcely elongated or thickened in fruit; calyx narrowly campanulate, subequally 5-cleft two-thirds its length, 18-20 mm. long, segments erect, ovate-lanceolate, acute; corolla apparently reddish, cylindrical, villous without, ca. 4 cm. long, tube 7-8 mm. long, 4-5 wide, glabrous within at base, throat gradually ampliate, 6-7 mm. wide at its middle, ca. 30 mm. long, somewhat pubescent within especially near base and along the 2 prominent ridges on the corolla floor, lobes rounded, 5-6 mm. long, 4-5 wide, not spreading, division between upper and lower lips ca. 8 mm. deep; stamens 4, included, filaments flat, adnate for 5 mm., free parts of upper pair ca. 25 mm. long, of lower 32

mm., heavily pubescent near base and with tack-shaped glands near tips, anther-sacs ca. 1 mm. long after dehiscence, circular, discrete, divergent; sterile filament adnate to near the anther, ca. 20 mm. long; pistil filiform, glabrous, ca. 30 mm. long; capsule glabrous, globular, ca. 1 cm. long, distending the calyx, thin-walled, dehiscing apparently at first by 2 terminal openings, but soon becoming irregular; seeds brown, ca. 1.5 mm. long, oblong, with large irregular corky tubercles, but apterous.

Type locality: Bolaños, Jalisco, Mexico, Sept. 15 to Oct. 1, 1897, *J. N. Rose 2950* (U. S. No. 301903).

7. *MAURANDYA PURPUSII* Brandegee, *Zoe* 5:256. 1906.

M. purpusii of Curtis, *Bot. Mag.* IV, 13: t. 8697. 1917. Bailey, *Cyclop. Hort.* 4:2013. 1916. *M. erubescens* var. *purpusii* (Brandg.) Johnston, *Proc. Calif. Acad.* IV, 12:1164. 1924.

Perennial herb with thickened fleshy roots, stems ascending or prostrate, scarcely scandent, 9-12 dm. high, finely glandular-puberulent; leaves alternate, blades thin, glabrate above, puberulent below especially on veins, somewhat bicolored, triangular-cordate, obscurely 5-lobed, remotely and shallowly mucronate-dentate to subentire, acute, 3-5 cm. long and equally wide, petioles glandular-puberulent, approaching leaf-blades in length; flowers solitary axillary, pedicels glabrous, ascending, slender, 4-5 cm. long (10 in hort.); calyx herbaceous tinged with purple, glabrate to puberulent, 5-parted, ca. 15 mm. long, segments erect, oblong-ovate, rounded and apiculate, cordate at base; corolla rose purple, funnelform, somewhat 2-lipped, 3.5-4 cm. long, glabrate without, tube slightly swollen at base in front, 12-14 mm. long, constricted ca. 5 mm. above base, glabrous within except on 2 yellow prominent plaits which continue into the rapidly ampliate throat, limb 2-lipped, lobes reflexed, subequal, suborbicular, almost 1 cm. long; fertile stamens subequal, barely exserted, filaments glandular above, densely coarsely pubescent below, anthers discrete, circular after dehiscence, each sac ca. 1 mm. long; sterile stamen half as long as fertile ones, heavily pubescent below; style almost

equal to stamens, glandular-pubescent below, filiform, persistent, stigma scarcely bilobed, ovary ovate, glandular-pubescent; capsule "ellipsoid", ca. 12 mm. long, glabrate, included in slightly spreading calyx; seeds brown, coarsely corky-tuberculate, body ca. 1 mm. long, with emarginate striate, irregular light-colored wing.

Material seen, the type collection, San Luis Tultitlanapa, Puebla, near Oaxaca, *Purpus* 2567 (C, F, G, M, NY, S, US). The presence of the two prominent plaits in the floor of the corolla certainly distinguishes this plant sufficiently to make it a species distinct from *M. erubescens* which lacks such folds but has merely two lines of hair.

8. *MAURANDYA ERUBESCENS* (Don) Gray, Proc. Am. Acad. 7:377. 1868.

Frutescent, slender, branching freely, climbing by the twining petioles and pedicels, stems glandular-puberulent to pilose throughout; leaves thin, triangular-hastate or -cordate to obscurely 5-lobed, glabrate to soft-pubescent, coarsely dentate, somewhat bicolored, lower ones opposite, blades up to 15 cm. long and equally wide, subcordate, acuminate at tip, petioles up to several cm. long, glabrate to glandular-pilose, upper leaves reduced, alternate; flowers solitary, axillary, spreading horizontally, pedicels 2-6 cm. long, ebracteate, pubescent; calyx 5-parted, glabrate or pubescent without and within and tipped with minute glands, green or with purplish tinge, segments subequal, 15-20 mm. long, erect in anthesis, spreading in fruit; corolla 4-7 cm. long, tubular for 1.5-2 cm., constricted ca. 1 cm. above base, glabrous within below constriction, coarsely yellowish pubescent at narrow part, gradually ampliate upwards especially on the lower side, subarcuate, glabrate to finely pubescent without, limb with 2 upper lobes reflexed, & 3 lower ones somewhat erect, subequal, ca. 1 cm. long, 1.5 cm. wide, finely glandular, throat whitish with 2 plaits with bright yellow hairs; stamens connivent at outer extremities, scarcely dilated except at very base, not exserted, glandular toward tips, geniculate and heavily bearded toward base,

anther-sacs discrete, ca. 1.5 mm. long, circular after dehiscence; 5th stamen reaching about to genicula of others; pistil equaling stamens, ovary finely glandular-pubescent, stigma usually bifid; capsule pubescent, subglobular, 1.5 cm. long, surmounted by slender persistent base of style, dehiscing by 2 irregular slits; seeds having body ca. 1 mm. long, brown, oblong, coarsely corky tuberculate, and with a broad, paler, emarginate and lacerated wing.

8a. **Maurandya erubescens** var. **typica**, nom. nov.

Lophospermum erubescens Don in Sweet, British Fl. Gard. (II) 1: t. 75, note. 1830. Zuccarini, Muenchen, Abhandl. 1:305. 1832. Flora, Beibl. 2:61. 1832. Lindl., Bot. Reg. 17: t. 1381. 1831. Benth. in D. C., Prodr. 10:297. 1846. *L. scandens* Don, in Sweet, Brit. Fl. Gard. (II) 1: t. 68. 1830. Graham, in Curtis, Bot. Mag. 57: tt. 3037, 3038, 1830. Chavannes, Monogr. Antirrh., 75. t. 11. 1833. *Maurandya erubescens* (Don) Gray, Proc. Am. Acad. 7:377. 1868. Hemsley, Gard. Chron. (N. S.) 17:22. 1882. Biol. Centr. Am. 2:441. 1882. Gard. Chron. (2) 20:500., f. 81. 1883. Urbina, Cat. Pls. Mex., 256. 1897. Bailey, Cyclop. Hort., 4:2012. 1916. Johnston, Proc. Calif. Acad. Sci. (IV) 12:1164. 1924.

Plant densely soft pubescent throughout; calyx-segments pubescent, oblong-ovate, acute, to obtuse; corolla glandular-pubescent without, rose-colored, throat white with rose-colored spots on its roof.

Type locality: Jalapa, Mex. Material studied, MEXICO: Tamasopa Cañon, San Luis Potosi, *Pringle* 3560 (G), 3704 (C, F, G, M, NY, Ph, US); Barrance de Tenampa, Vera Cruz, *Purpus* 2952 (C, F, G, M, NY, US); Orizaba, *Bourgeau in* 1865-66 (G), *Botteri* 129 (G, US); Cerro del Boqueron, Chiapas, *Purpus* 6696 (C, F, G, M, NY, US). COLUMBIA et ECUADOR, without definite locality, *Lehmann* 5598 (US). VENEZUELA: Colonia Tovar, *Pittier* 9256 (G, NY, US), *Jahn* 478 (US). JAMAICA: Troy, *Perkins* 1315 (G); St. Helens Gap, St. Andrews, *Maxon & Killip* 574 (F, G, NY, US); Morces Gap, *Nichols* 22 (F, G, M, NY,

US); Tweedside, S. St. Andrews, *Harris* 6920 (F, NY); Cinchona, *Clute* 198 (M, Ph, US), *Harris & Laurence* C15269 (NY), C15189 (US), *Harris* 9150 (NY); Hardmere Gap, *Britton & Hollick* 1784 (NY); Battersea, *Britton* 3778 (NY); Mandeville, *Crawford* 800 (Ph); New Haven Gap, *Maxon* 2608 (US); Blue Mts., *Hitchcock* (F, M); without locality, *Parry* in 1871 (US). BERMUDA: Public Garden, *Broxen & Britton* 919 (NY). AZORES: San Miguel, *Carreira* 228A (M). Hort. Cantab., in 1845 (G). Hort. Basil, in 1839 (NY).

Approaching *glabrata*, for example, *Purpus* 6696.

8b. MAURANDYA ERUBESCENS var. GLABRATA Johnston, Proc. Calif. Acad. Sci. IV, 12:1164. 1924.

Lophospermum scandens Don, Trans. Linn. Soc. 15:353. 1826. Maund, Botanist, t. 17. 1837. Graham in Curtis, Bot. Mag. 65: t. 3650. 1838. Don, in Sweet, Brit. Fl. Gard. 2: t. 401. 1837. Benth. in D. C., Prodr. 10:297. 1846. *Maurandia scandens* of Gray, Proc. Am. Acad. 7:377. 1868. Hemsley, Gard. Chron. (N. S.) 17:22. 1882. Biol. Centr. Am. 2:442. 1882. Smith, Enum. Pl. Guat. 3:57. 1893, probably of Smith, l. c., 2:55. 1890. *M. lophospermum* Bailey, Cyclop. Hort. 4:2013. 1916.

Type locality: Mexico. Material studied: MEXICO: Morelos, Cuernavaca, *Pringle* 6882 (C, F, G, M, NY, Ph, Po, US); Sierra de Tepoxlan, Morelos, *Rose & Painter* 7245 (Ph, US); Jalapa, Vera Cruz, *Rose & Hay* 6155 (US). GUATEMALA: S. Miguel Uspantan, Guiche, *Smith* 3130 (G, NY, US). Cultivated: Hort. Cantab., in 1866 (G).

Plant finely glandular-pubescent to glabrate; calyx-segments glabrate, lance-ovate, acuminate; corolla glabrate without, "purplish rose-colored, obscurely dotted on its outside."

9. MAURANDYA ERECTA Hemsley, Gard. Chron. (N. S.) 17:22. 1882. Biol. Centr. Am. 2:441. 1882.

M. erecta of Johnston, Proc. Calif. Acad. Sci. IV, 12:1164. 1924.

Erect perennial herb, glandular-villous and viscous throughout, stems 3-4 dm. tall, quite unbranched, densely leafy; leaf-

blades orbicular-cordate to cordate-reniform, thick, 1-4 cm. long, 1.5-6 cm. wide, shallowly coarsely crenate, apparently bi-colored, light green, 5-nerved, petioles equaling the blades; flowers horizontal, solitary in upper axils, pedicels slender, spreading, 1-1.5 cm. long; calyx herbaceous, campanulate, 12-14 mm. long, cleft to below middle, lobes oblong, obtuse glandular-pubescent within and without, not spreading in fruit; corolla 3.5-4. cm. long, funnelform, glandular-pubescent without, tube ca. 7 mm. long, 5 mm. wide, narrowed above the ovary, glabrous within, throat gradually amplified, more so on lower side, with 2 prominent hairy plaits, hairy within at base, lobes sub-orbicular 6-8 mm. long; fertile stamens didynamous, longer ones reaching almost to base of corolla-lobes, upper ones distinctly shorter, all glandular toward apex, geniculate and heavily pubescent above the dilated glabrous bases, anthers discrete, circular after dehiscence; sterile filament scarcely reaching genicula of others; style about as long as stamens, filiform, slightly glandular, stigma somewhat bilobed, ovary globose, glandular; capsule globose, ca. 12 mm. long, scarcely shorter than calyx, glabrate; seeds light brown, body 1.5 mm. long, oblong with elongate corky irregular tubercles and broad irregular, emarginate straw-colored, striate wing.

Type locality: San Lorenzo de Laguna, Coahuila, Mex. Material seen: MEXICO: San Lorenzo de Laguna, Coahuila, *Palmer* 966 (G, Ph, US); Sierra de Parras, Coahuila, *Purpus* 1049 (C, G, F, M, NY); Viesca, Coahuila, *Purpus* 540 (C, Po, US); Cuingar, *Edwards* (NY); Ixtacuixtla ?, Tlacala, *Purpus* 37 (C, M, Po, US); Cerro de San Ignacio, Durango, *Purpus* 4585 (C); without locality, *Edwards* (G).

EXCLUDED SPECIES

Excluded species, *Lophospermum physalodes* D. Don, Trans. Linn. Soc. 15:353. 1827. equals *Gastromeria physalodes* of Sweet, Brit. Fl. Gard. N. S., 75. note. 1831, or *Melasma hispidum* Benth.

VII. RHODOCHITON

1. RHODOCHITON VOLUBILE Zucc. by Otto & Dietr., Verh. Ver. Gart. Preuss. 10:152. t. 1. 1829?

R. volubile of Martens & Galeotti, Bull. Acad. Rot. Brux. 12; no. 7, p. 3. 1845. Benth. in D. C., Prodr. 10:298. 1846. Paxton, Bot. Mag. 2:27. 1836. Graham in Curtis, Bot. Mag. 61: t. 3367. 1834. Lindl., Bot. Reg. 21: t. 1755. 1835. Hemslley, Gard. Chron. (IV) 17:22. 1882. Biol. Centr. Am. 2: 442. 1882. Revue Hort., 1910:78-79. Gard. Chron. III, 53:310. 1913. Bailey, Cyclop. Hort. 5:2930. 1916. *Lophospermum atosanguineum* Zucc., Abhandl. Muench. 1:306. t. 13. 1832. *L. rhodochiton* Don, in Sweet, Brit. Fl. Gard. N. S., 3: t. 250. 1834.

Suffrutescent, slender, climbing by means of twining petioles and pedicels, stems slender, sparsely glandular-villous, younger branches purple; leaves thin, alternate, triangular-cordate, somewhat 5-lobed, remotely mucronate-dentate, acuminate, glabrate, somewhat bicolored, often purplish tinged, blades 2-8 cm. long, equally broad, petioles almost equal to leaves, sparingly villous; flowers solitary, axillary, pendulous, pedicels slender, glabrate, 8-12 cm. long; calyx campanulate, spreading, ca. 2.5 cm. long, divided to the middle into 5 ovate acute lobes, pale purple, membranous, minutely glandular-pubescent, especially within; corolla straight, funnel-shaped, glandular-pubescent without, deep purple, 4-5 cm. long, tube 5 sided, 12-14 mm. long, constricted above ovary, glabrous within at base, pubescent at constriction, throat gradually expanded to 1 cm. wide, glabrous within not plaited, limb of 5 subequal erect obtuse lobes ca. 1 cm. long and 6-7 mm. wide, glabrous within; 4 fertile stamens subequal, anthers slightly exserted, discrete, subcircular after dehiscence, filaments glabrous above, heavily expanded above the pubescent base, not strongly geniculate; 5th sterile stamen very reduced; pistil slightly exceeding stamens, ovary green, globose, finely glandular-pubescent, style filiform, persistent slightly pubescent below, stigma short, bilobed; capsule globose, glabrate, 2-celled,

bursting irregularly at top, slightly over 1 cm. long; seeds brown, the body tubercular, ca. 1.5 mm. long, with a broad lighter-colored irregular wing split at both ends.

Type locality: Mexico. Material seen: MEXICO: Camino de Escalera, de Zantla a Pápalo, Oaxaca, *Gonzalez & Conzatti* 756 (G, US); Oaxaca, *Nelson in 1894* (US). Cultivated: Botanic Garden, Harvard *in 1872* (G), *in 1868* (G), *in 1878* (G); Hort. Bot. Basil, *in 1841* (NY); San Diego, *Brandeggee Garden in 1895* (C); *Bernhardi Herb.* (M).

